OMRON

Vision Sensor

FH Series

Vision System

Operation Manual for Sysmac Studio

FH-1□□□
FH-3□□□

SYSMAC
always in control

Z343-E1-04

Introduction

Thank you for purchasing the FH.
This manual provides information regarding functions, performance and operating methods that are required for using the FH.
When using the FH, be sure to observe the following:

- The FH must be operated by personnel knowledgeable in electrical engineering.
- To ensure correct use, please read this manual thoroughly to deepen your understanding of the product.
- Please keep this manual in a safe place so that it can be referred to whenever necessary.

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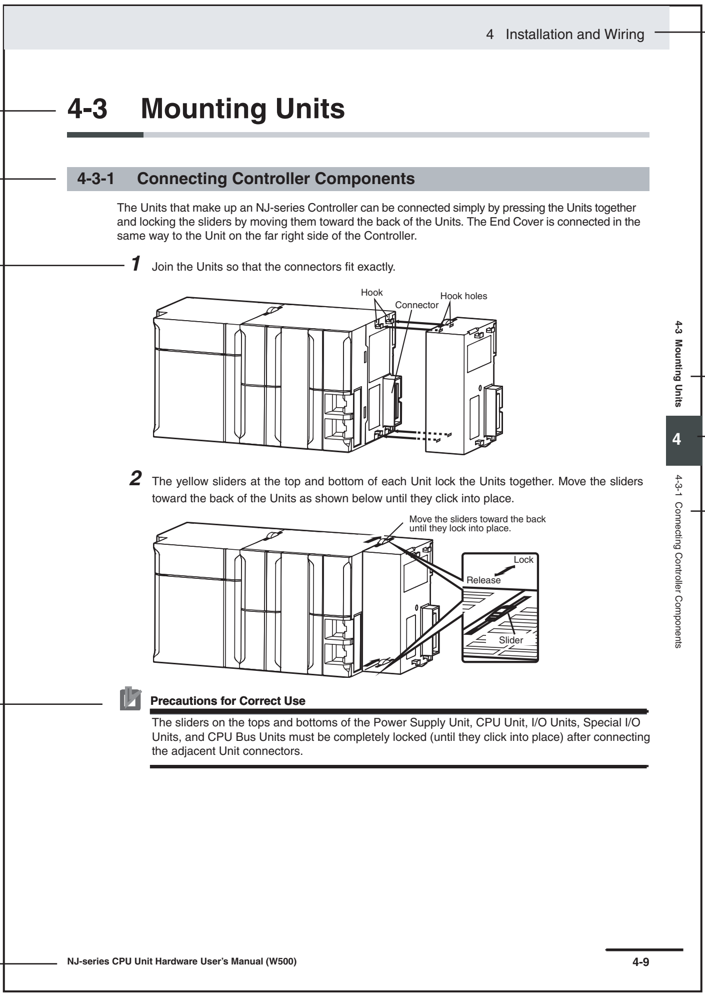
Manual Structure

Page Structure

The following page structure is used in this manual.



4 Installation and Wiring

4-3 Mounting Units

4-3-1 Connecting Controller Components

The Units that make up an NJ-series Controller can be connected simply by pressing the Units together and locking the sliders by moving them toward the back of the Units. The End Cover is connected in the same way to the Unit on the far right side of the Controller.

1 Join the Units so that the connectors fit exactly.

Hook
Connector
Hook holes

2 The yellow sliders at the top and bottom of each Unit lock the Units together. Move the sliders toward the back of the Units as shown below until they click into place.

Move the sliders toward the back until they lock into place.
Lock
Release
Slider

Precautions for Correct Use

The sliders on the tops and bottoms of the Power Supply Unit, CPU Unit, I/O Units, Special I/O Units, and CPU Bus Units must be completely locked (until they click into place) after connecting the adjacent Unit connectors.

4-3 Mounting Units
4
4-3-1 Connecting Controller Components

NJ-series CPU Unit Hardware User's Manual (W500)

4-9

Level 1 heading

Level 2 heading

Level 3 heading

Gives the current headings.

Level 2 heading

Level 3 heading

A step in a procedure

Indicates a procedure.

Page tab

Gives the number of the main section.

Special information

Icons indicate precautions, additional information, or reference information.

Manual name

This illustration is provided only as a sample. It may not literally appear in this manual.

Special Information

Special information in this manual is classified as follows:

Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.

Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.

Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.

Version Information

Information on differences in specifications and functionality for CPU Units with different unit versions and for different versions of the Sysmac Studio is given.

Note References are provided to more detailed or related information.

Terminology

- For descriptions of the Controller terms that are used in this manual, refer to information on terminology in *NJ-series CPU Unit Software User’s Manual* (Cat. No. W501) and *NJ-series CPU Unit Hardware User’s Manual* (Cat. No. W500).
- For descriptions of the FH/FZ5 Sensor controller terms that are used in this manual, refer to information on terminology in *Vision System FH/FZ5 series User's Manual* (Cat. No. Z340).

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1 Overview

2 Basic Operations

3 Connecting with a Vision Sensor

4 Configuraing Measurement Settings

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8 Other Useful Functions

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Related Manuals

The following manuals are related to the FH-series Sensor Controllers. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
Vision System FH Series Operation Manual for Sysmac Studio (This manual)	Z343	FH-1□□□ FH-3□□□	Learning about how to configure settings for and operate the sensor controller for the FH Series from the Sysmac Studio FH Tools	In this manual, we will describe how to configure settings for and operate the sensor controller for the FH Series from the Sysmac Studio FH Tools.
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC-SE2□□□	Learning about the operating procedures and functions of the Sysmac Studio	Describes the operating procedures of the Sysmac Studio.
Vision System FH/FZ5 Series User's Manual	Z340	FH-1□□□ FH-3□□□ FZ5-L35□ FZ5-6□□ FZ5-11□□	Learning about how to configure settings for the FH/FZ5 Series Vision Sensors	In this manual, we will describe how to configure settings using the sensor controller for the FH/FZ5 Series Vision Sensors.
Vision System FH/FZ5 Series Processing Item Function Reference Manual	Z341	FH-1□□□ FH-3□□□ FZ5-L35□ FZ5-6□□ FZ5-11□□	Learning about how to configure settings for processing items for the FH/FZ5 Series Vision Sensors	In this manual, we will describe how to configure settings for processing items for the FH/FZ5 Series Vision Sensors.
Vision System FH/FZ5 Series User's Manual for Communications Settings	Z342	FH-1□□□ FH-3□□□ FZ5-L35□ FZ5-6□□ FZ5-11□□	Learning about how to configure communications settings for the FH/FZ5 Series Vision Sensors	In this manual, we will describe how to configure communications settings using the sensor controller for the FH/FZ5 Series Vision Sensors.

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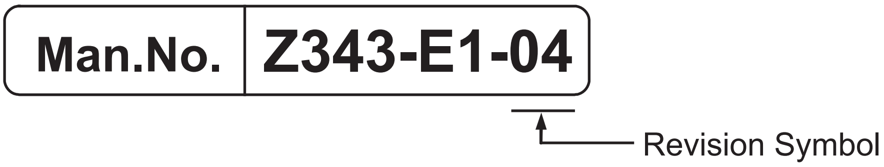
Manual Revision History

The manual revision symbol is appended to the manual number on the front cover and back cover.



Revision Symbol	Revision Date	Reason for Revision and Revised Page
01	June 2013	First edition
02	September 2013	Added offline debugging function, Support for software version 5.1 of the FH sensor controller.
03	January 2014	Added additional supported processing units, added support for multiple FH unit settings, added a security function, expanded data transfer functions.
04	July 2014	Additions for software version upgrade. Support for software version 5.20 of the FH sensor controller.

1

Overview

This document describes the functional specifications of the Sysmac Studio FH tools (hereinafter referred to as "FH tools").

1-1 Supported Models **1-2**
1-2 Project Management **1-3**

1-1 Supported Models

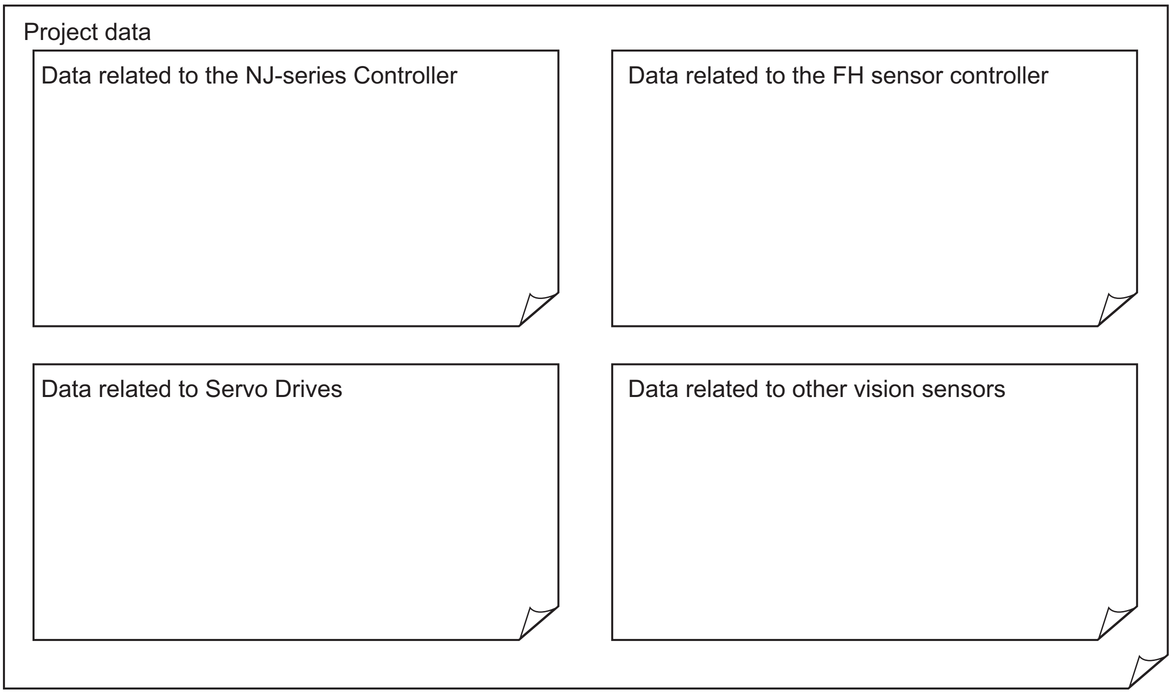
The FH tool supports the following models in the FH Vision Sensor series.

Connection Device Type	Description
FH-3050	High-speed controller for 2-channel camera type
FH-3050-10	High-speed controller for 4-channel camera type
FH-3050-20	High-speed controller for 8-channel camera type
FH-1050	Standard controller for 2-channel camera type
FH-1050-10	Standard controller for 4-channel camera type
FH-1050-20	Standard controller for 8-channel camera type

1-2 Project Management

Sysmac Studio manages the configuration Information of each of the controller, servo, and vision sensor devices on a project basis.

Here, we describe the contents of the project data related to the FH Sensor Controller and how the data is managed.


Project data
Data related to the NJ-series Controller
Data related to the FH sensor controller
Data related to Servo Drives
Data related to other vision sensors

1-2-1 Project data

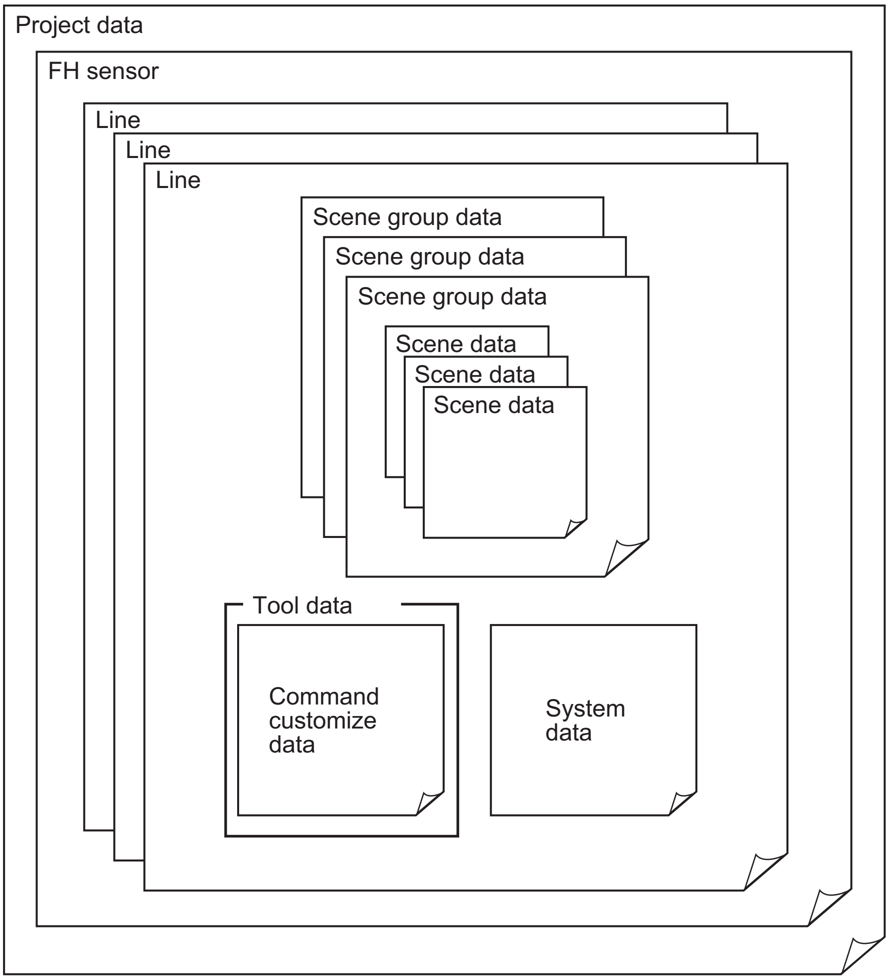
Eight FH vision sensor series devices can be registered to one project.

In the FH sensor controller series, the following types of data provided by Sysmac Studio are managed as project data.

- Scene group data (scene data)
- System data
- Tool data (communications command macros, security settings, and other data)

By using the Multi-line Random-trigger Mode, the FH sensor controller independently processes multiple processing lines at the same time.

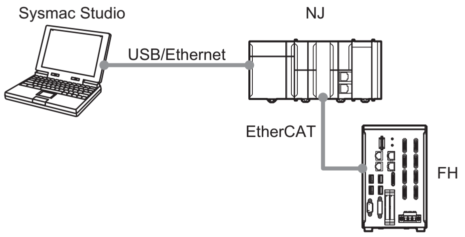
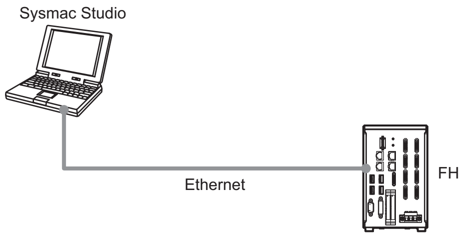
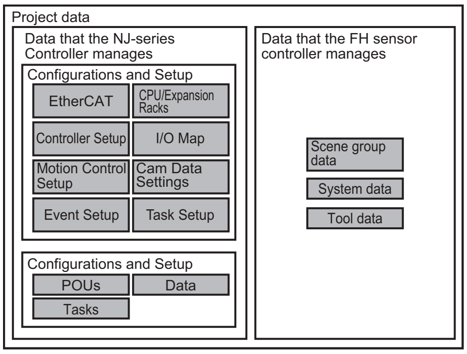
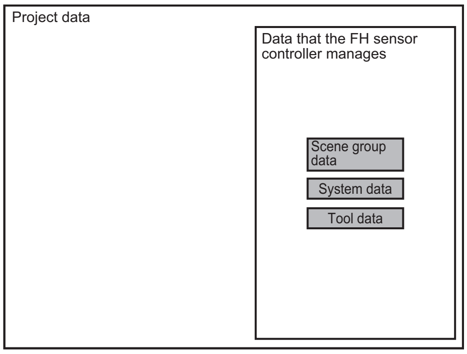
Project data manages these data together as one batch. These data can also be exported and imported individually as file data.


Project data
FH sensor
Line
Line
Line
Scene group data
Scene group data
Scene group data
Scene data
Scene data
Scene data
Tool data
Command customize data
System data

1-2-2 Project Data Handling in Different System Configurations

The contents of the Sysmac Studio project data and the data being synchronized vary depending on the connection method (i.e., Ethernet direct connection or connection through an NJ-series Controller) between the FH sensor controller and the computer that runs Sysmac Studio. Particularly with the connection through an NJ-series Controller, there are restrictions on the Sysmac Studio functionalities execution. Be sure you understand the following before operation.

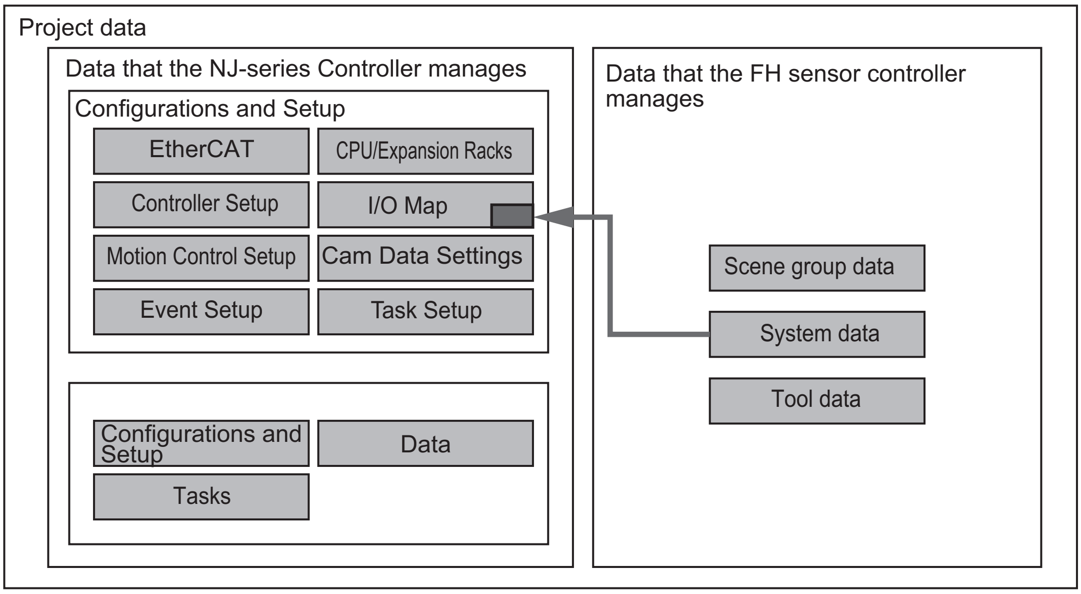
Refer to *2-8 Precautions on Synchronization through an NJ-series Controller* on page 2-39.

	(1) Connection through an NJ-series Controller (when executing an NJ project)	**(2) Ethernet direct connection (when executing an FH project)**
System configuration	 Sysmac Studio NJ USB/Ethernet EtherCAT FH	 Sysmac Studio Ethernet FH
Project data that the Sysmac Studio manages	There are two types of data: the data that the NJ-series Controller manages and the data that the FH sensor controller manages.  Project data Data that the NJ-series Controller manages Configurations and Setup EtherCAT CPU/Expansion Racks Controller Setup I/O Map Motion Control Setup Cam Data Settings Event Setup Task Setup Configurations and Setup POUs Data Tasks Data that the FH sensor controller manages Scene group data System data Tool data	There is the data that the FH sensor controller manages.  Project data Data that the FH sensor controller manages Scene group data System data Tool data
Data to be synchronized with Sysmac Studio	The data that the NJ-series Controller manages within the project data that Sysmac Studio manages is synchronized. Because the data that the FH sensor controller manages (i.e., the settings data for the FH sensor controller) is not synchronized, the settings for the FH sensor controller need to be synchronized separately. Refer to *2-8 Precautions on Synchronization through an NJ-series Controller* on page 2-39	The data that the FH sensor controller manages (i.e., the settings data for the FH sensor controller) within the project data that Sysmac Studio manages is synchronized. Refer to *3-3 Synchronizing Project Data and Sensor Settings Data* on page 3-8
Available functions in Sysmac Studio that control the FH sensor controller online	Checking the data output from the FH sensor controller and sent through EtherCAT is possible. Setting the settings data, and creating and adjusting the measurement flows for the FH are not possible.	Setting the settings data, creating and adjusting the measurement flows for the FH besides checking the output data from the FH sensor controller are possible.
Available functions in Sysmac Studio that control the FH sensor controller offline	Checking the data output from the FH sensor controller and sent through EtherCAT is possible. Setting the settings data, and creating and adjusting the measurement flows for the FH besides checking the output data from the FH sensor controller are possible.	Setting the settings data, creating and adjusting the measurement flows for the FH besides checking the output data from the FH sensor controller are possible.

	(1) Connection through an NJ-series Controller (when executing an NJ project)	(2) Ethernet direct connection (when executing an FH project)
Downloading the settings data for the FH sensor controller	The settings data for the FH sensor controller is not downloaded. Performing the data downloading from Sysmac Studio will not download the data that the FH sensor controller manages within the project data that Sysmac Studio manages. Therefore, the settings for the FH sensor controller will not be overwritten. There are following two methods to download the FH settings data to the FH sensor controller. • Direct connecting to the FH sensor controller and downloading the data • Extracting the data from Sysmac Studio and loading it to the FH sensor controller via the external memory.	Downloading the FH settings data from Sysmac Studio is possible. If the FH sensor controller is connected to the computer that runs Sysmac Studio via Ethernet, downloading the FH settings data from Sysmac Studio to the FH sensor controller is possible by transferring the project data that the Sysmac Studio manages to the FH sensor controller via the Ethernet. If not connected, right-click the FH sensor controller in the Multiview Explorer and select [Save file] from the menu to save the data in the external memory. Then, load the data in the external memory to the FH sensor controller.
Uploading the settings data for the FH sensor controller	The settings data for the FH sensor controller is not uploaded. After performing the data uploading to Sysmac Studio, all the FH settings data values (i.e., the scene group data, the system data, the communications command macros, and the security settings data) that the FH sensor controller manages within the project data that Sysmac Studio manages will be reset to the factory defaults. The device variables related to the FH sensor controller in the I/O Map are uploaded. There are following two methods to transfer the settings data for the FH sensor controller to Sysmac Studio. • Direct connecting to the FH sensor controller and uploading the data • Save the settings data in the FH sensor controller in the external memory and load it to Sysmac Studio via the external memory.	Uploading the settings data for the FH sensor controller to Sysmac Studio is possible. If the FH sensor controller is connected to the computer that runs Sysmac Studio via Ethernet, loading the data in the FH sensor controller to Sysmac Studio project is possible by transferring the FH settings data to the project via Ethernet. If not connected, connect the external memory that holds the FH settings data to the computer that runs Sysmac Studio. Then, right-click the FH sensor controller in the Multiview Explorer and select [Load from file] from the menu to load the data.

Precautions for Correct Use

The data that the NJ-series Controller manages and the data that the FH sensor controller manages are handled separately on Sysmac Studio except for the I/O Map data that the NJ-series Controller manages. The I/O Map is associated to the system data that the FH sensor controller manages. Because of this, the information in the I/O Map will be updated and changed after editing the data that the FH sensor controller manages (i.e., the settings data for the FH sensor controller).


Project data
Data that the NJ-series Controller manages
Configurations and Setup
EtherCAT
CPU/Expansion Racks
Controller Setup
I/O Map
Motion Control Setup
Cam Data Settings
Event Setup
Task Setup
Configurations and Setup
Data
Tasks
Data that the FH sensor controller manages
Scene group data
System data
Tool data

2

Basic Operations

This chapter describes the basic design flow and design items for using Sysmac Studio.

2-1 Basic Design Flow 1 2-3

2-2 Basic Design Flow 2 2-5

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2-3-1 Creating a New Project File from the Project Window 2-6
2-3-2 Adding FH Device to a Project 2-8
2-3-3 Deleting FH Device from a Project 2-8

2-4 Description of Screen Components 2-9

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2-4-2 Menu Bar 2-10
2-4-3 Toolbar 2-10
2-4-4 Multiview Explorer 2-10
2-4-5 Edit Pane 2-12
2-4-6 Toolbox 2-24

2-5 Basic Operations of Scene Data 2-25

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2-5-2 Managing Scenes 2-26
2-5-3 Entering Scene Information 2-27
2-5-4 Searching for a Scene 2-27
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2-8 Precautions on Synchronization through an NJ-series Controller 2-39

2-8-1 Synchronized Project Data 2-40
2-8-2 Saving and Loading the Settings Data for the FH Sensor Controller 2-41
2-8-3 Transferring Data from the Sysmac Studio 2-42
2-8-4 Transferring Data to the Sysmac Studio 2-44

Precautions for Correct Use

- The data being synchronized varies depending on the connection method (i.e., Ethernet direct connection or connection through an NJ-series Controller) between the FH sensor controller and the computer that runs Sysmac Studio.
- For information on connection through an NJ-series Controller, refer to *2-8 Precautions on Synchronization through an NJ-series Controller* on page 2-39

2-1 Basic Design Flow 1

This section describes the flow for designing a system that uses NJ-series CPU Unit as a controller.

For details on the program on the NJ-series CPU Unit side, task design, and debugging, refer to *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

● New project settings

Create a project file.

1 Starting Sysmac Studio

Start Sysmac Studio.

Refer to *3-3-1 Starting and Exiting the Sysmac Studio* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

2 Designing a new project

Create a new project.

Refer to *3-3-2 Creating a Project File* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

● Controller configuration and settings

- Controller configuration

  (1) Creating an EtherCAT configuration

  Register FH as an EtherCAT slave in [EtherCAT].

  Refer to *5-1 EtherCAT Configuration and Settings* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

  (2) Registering device variables

  When using or using after editing device variables for the user defined variables to connect the FH I/O information and program, register the device variables in [I/O Map].

  Refer to *4-1-2 Creating Device Variables* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

- Controller settings

  (1) Editing slave parameters

  Edit the *Operation Settings* of the slaves.

  Refer to *5-2-1 Creating the EtherCAT Slave Terminal Configulation* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

● Sensor connection

Establish an online connection with the sensor.

(1) Connecting a sensor

Refer to *Section 3 Connecting with a Vision Sensor*

Design

Create the processing flow.

(1) Creating flow

Refer to *2-6 Basic Operations of Flow Editing* on page 2-30

(2) Editing processing units

Refer to *4-2 Editing a Processing Unit* on page 4-4

Online debugging of sensor

Perform debugging using the actual device.

(1) Performing test measurement

Perform test measurement on sample work. Adjust the parameters if necessary.

Refer to *Section 6 Online Debugging*

Precautions for Correct Use

The settings data for the FH sensor controller cannot be synchronized with the data in the Sysmac Studio project via an NJ-series Controller.

Refer to *2-8 Precautions on Synchronization through an NJ-series Controller* on page 2-39

To synchronize them, directly connect the FH sensor controller to the computer that runs Sysmac Studio via Ethernet.

Refer to *3-3 Synchronizing Project Data and Sensor Settings Data* on page 3-8

2-2 Basic Design Flow 2

This section describes the flow for designing a system that uses a controller other than NJ-series CPU Unit.

● New project settings

Create a project file.

(1) Starting Sysmac Studio

Start Sysmac Studio.

Refer to *3-3-1 Starting and Exiting the Sysmac Studio* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

(2) Designing a new project

Create a new project.

Select a vision sensor for the category and FH for the device.

Refer to *2-3 Creating a New Project* on page 2-6

(3) Selecting sensor type

Select the sensor type and then establish an online connection.

Refer to step 3 on P. 2-7 of *2-3-1 Creating a New Project File from the Project Window* on page 2-6

● Sensor configuration and settings

- Sensor configuration

(1) Creating an interface configuration for the sensor

Edit the interface configuration.

Refer to *5-1 Setting Procedure* on page 5-3

- Sensor settings

(1) Editing the communication conditions

Edit the communication conditions of the sensor.

Refer to *5-1 Setting Procedure* on page 5-3

● Design

Create the processing flow.

(1) Creating flow

Refer to *2-6 Basic Operations of Flow Editing* on page 2-30

(2) Editing processing units

Refer to *4-2 Editing a Processing Unit* on page 4-4

● Online debugging

Perform debugging using the actual device.

(1) Performing test measurement

Perform test measurement on sample work. Adjust the parameters if necessary.

Refer to *Section 6 Online Debugging*

2-3 Creating a New Project

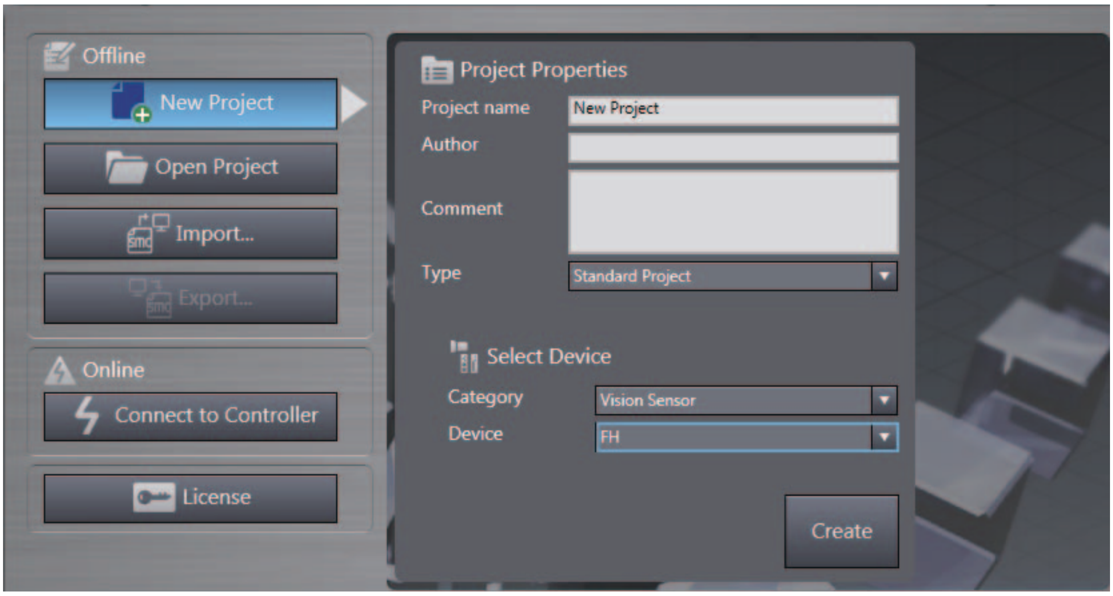
This section describes how to create a new project file. For details on the basic operations, refer to *3-3 Creating a Project* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

Here, we describe how to create a new project for the FH vision sensor (hereinafter referred to as "FH project").

2-3-1 Creating a New Project File from the Project Window

1. Click the [New Project] button in the project window.
2. In the [Project Properties] dialog box, enter the information in [Project name], [Author] (optional), and [Comment] (optional), select the following device from [Category] and [Device] of [Select Device], and click the [Create] button.

Item	Setting
Category	Vision sensor
Device	FH



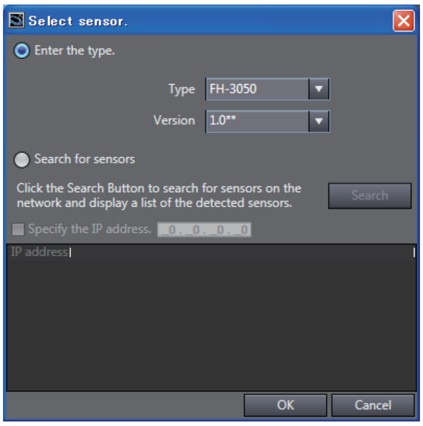
Project Properties
Project name: New Project
Author:
Comment:
Type: Standard Project
Select Device
Category: Vision Sensor
Device: FH

3 Select the FH vision sensor to which you connect.

When establishing an online connection, click [Search for sensors] and then click the [Search] button. The found sensors are displayed in a list. Select the sensor you wish to connect to and then click the [OK] button.

If you know the IP address of the sensor you wish to connect to beforehand or will connect to a sensor via a router, select the [Specify the IP address] check box and then enter the IP address in [IP address]. After input is complete, click the [OK] button.

If you wish to edit the settings offline, click [Enter the type], select the [Type] and [Version] items for the sensor you wish to edit, and then click the [OK] button.


Select sensor.
Search
IP address
OK
Cancel

● Enter the type.

Type: FH-3050

Version: 1.0**

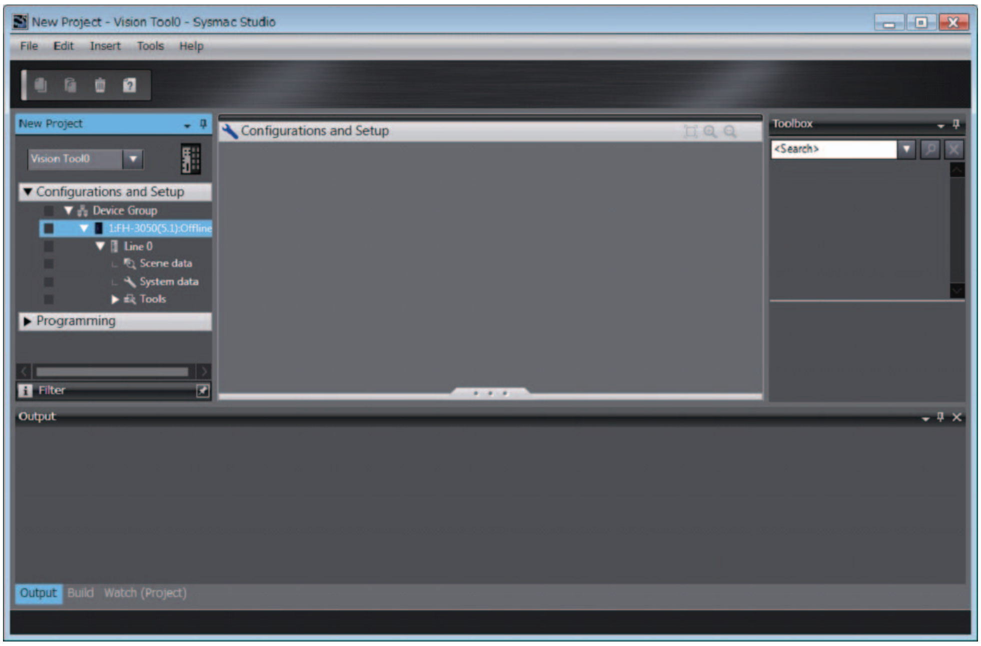
○ Search for sensors

Click the Search Button to search for sensors on the network and display a list of the detected sensors.

☐ Specify the IP address. 0 . 0 . 0 . 0

4 A new project is created.

The project file is created and the next screen appears.


New Project - Vision Tool0 - Sysmac Studio
File
Edit
Insert
Tools
Help
New Project
Vision Tool0
Configurations and Setup
Device Group
1:FH-3050(5.1):Offline
Line 0
Scene data
System data
Tools
Programming
Filter
Configurations and Setup
Toolbox
<Search>
Output
Output
Build
Watch (Project)

Precautions for Correct Use

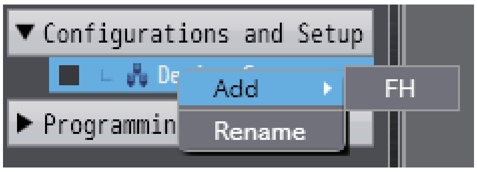
- An online connection cannot be established if the FH device registered to the project and the actual device are not the same type and version.
- If there is already a different FH slave device in the project with an established online connection, you will not be able to establish an online connection for a new FH slave device.

  To establish an online connection for a new FH slave device, switch the other FH slave device from online to offline.

2-3-2 Adding FH Device to a Project

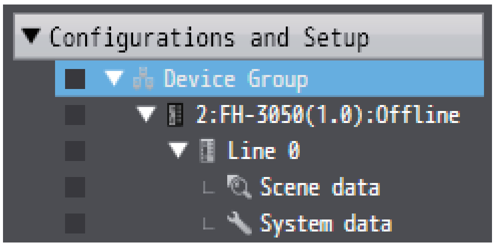
You can add an FH device to a project.

Right-click the Device Group and select [Add | FH].


Configurations and Setup
Device Group
Programmin
Add
Rename
FH

The sensor selection screen appears. Select the sensor type.

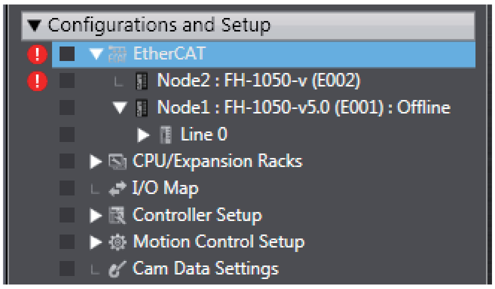
The selected FH device is registered.


Configurations and Setup
Device Group
2:FH-3050(1.0):Offline
Line 0
Scene data
System data

Precautions for Correct Use

Up to eight FH devices can be added to a single project.

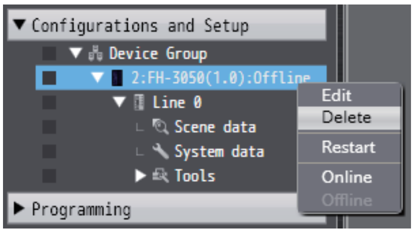
If more than eight FH devices are registered to a project, "❗" appears in the type field of the invalid FH devices.


Configurations and Setup
EtherCAT
Node2 : FH-1050-v (E002)
Node1 : FH-1050-v5.0 (E001) : Offline
Line 0
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings

2-3-3 Deleting FH Device from a Project

You can delete FH device from a project.

Right-click the FH vision sensor you wish to delete and select [Delete].

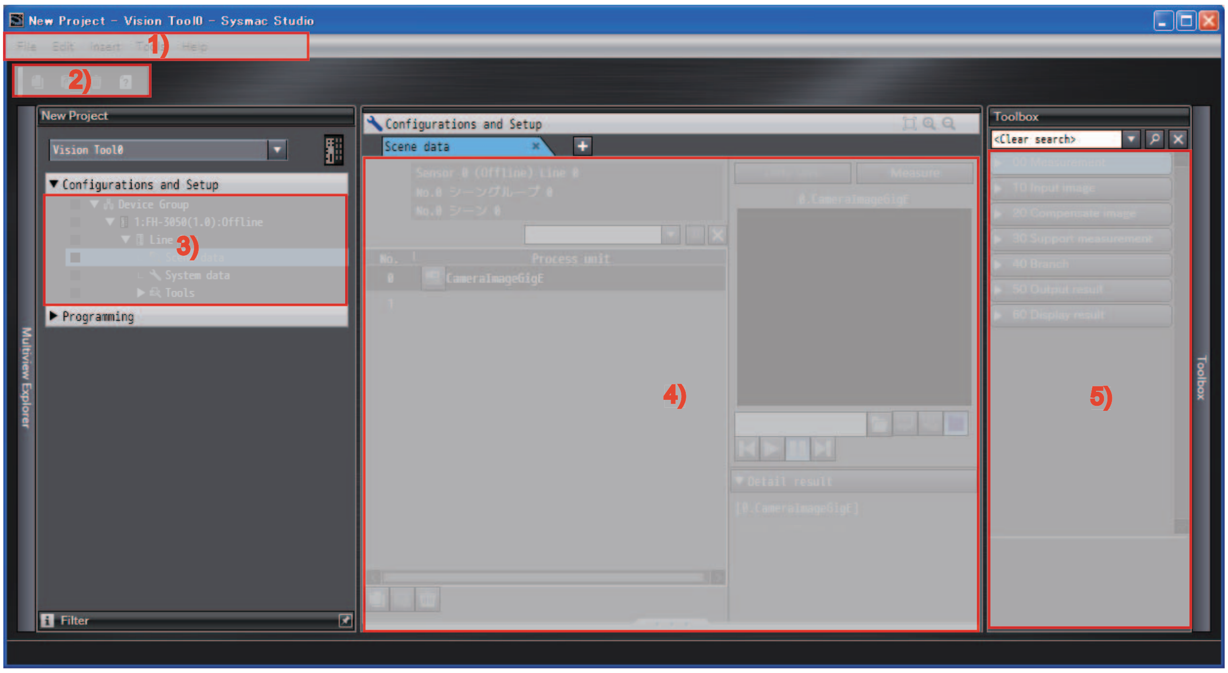

Configurations and Setup
Device Group
2:FH-3050(1.0):Offline
Line 0
Scene data
System data
Tools
Programming
Edit
Delete
Restart
Online
Offline

2-4 Description of Screen Components

This section describes the screen components in FH project.

For a description of the screen components in NJ-series CPU Unit project, refer to *3-4 Parts of the Window* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

2-4-1 Application Window


New Project - Vision Tool0 - Sysmac Studio
File Edit Insert Tools Help
1)
2)
New Project
Vision Tool0
Configurations and Setup
Device Group
1:FH-3050(1.0):Offline
Line 0
3)
Scene data
System data
Tools
Programming
Multiview Explorer
Filter
Configurations and Setup
Scene data
Process unit
CameraImageGigE
Measure
Detail result
4)
Toolbox
<Clear search>
00 Measurement
10 Input image
20 Compensate image
30 Support measurement
40 Branch
50 Output result
60 Display result
5)
Toolbox

No.	Name
1	Menu Bar
2	Toolbar
3	Multiview Explorer
4	Edit Pane
5	Toolbox

2-4-2 Menu Bar

Menu Name		Description
File	Close	Closes the project.
	Save	Saves the project.
	Save As	Saves the project with a different name.
	Save As New Number	Saves the project with a new update number.
	Import	Imports an exported file so that it can be edited in the tool.
	Export	Saves the project as an external file.
	Exit	Closes Sysmac Studio.
Edit	Copy	Copies the selected item.
	Paste	Pastes the copied item.
	Delete	Deletes the selected item.
View	Multiview Explorer	Displays the Multiview Explorer.
	Toolbox	Displays the Toolbox.
	Reset Window Layout	Resets the window layout.
Insert	Controller	Inserts an NJ301 or NJ501 project.
	Displacement Sensor	Inserts a ZW project.
	Vision Sensor	Inserts an FQ-M or FH project.
Tools	Options	Displays the Options menu.
Help	Help Contents	Displays “Vision System FH Series Operation Manual Sysmac Studio (Cat. No. Z343)."
	Online Registration	Performs online registration.
	Keyboard Mapping Reference	Displays the shortcut key reference.
	About Sysmac Studio	Displays the version of Sysmac Studio.

2-4-3 Toolbar

Button Name	Description
Copy	Copies the selected item.
Paste	Pastes the copied item.
Delete	Deletes the selected item.
Help	Displays Vision System FH Series Operation Manual Sysmac Studio (Cat. No. Z343)

2-4-4 Multiview Explorer

- This pane will be the access point for all data of the FH series.
- You can right-click any data item that can be set and select an item from the menu (context menu). You can also display various editing screens in the Edit Pane.
- Multiview Explorer can be displayed or hidden by clicking the display/hide bar on the left side of the window. Even when hidden, it can be displayed temporarily by placing the mouse pointer over the display/hide bar. Moving the mouse pointer away from the bar returns the Multiview Explorer to the hidden state.

List of the layers and items that make up the Multiview Explorer and the menu items displayed by right-clicking

Tree View Items		Menu Item	Description
Device Group		Add | FH	Adds a sensor to the project.
		Rename	Changes the device group name.
Type		Edit	Displays the main screen in the Edit Pane.
		Delete	Deletes the sensor from the project.
		Restart	Restarts the sensor.
		Online	Switches the connection state with the sensor to online.
		Offline	Switches the connection state with the sensor to offline.
		Stop offline editor	Ends the offline editor. Ends the following application. • FZ-CoreRA<current_line_number_0_to_7>.exe
		Change Version	Changes the sensor version. When the version is changed, the setting data is initialized. This menu item only appears in NJ Project.
Line X (X=0,1,,,7)		Monitor window	Displays the monitor window in the Edit Pane.
		Scene maintenance window	Displays the Scene maintenance window in the Edit Pane.
		Save data	Saves the sensor settings data to non-volatile memory.
		Rename	Changes the line name.
		Save to file	Saves scene group 0 + system data to a file.
		Load from file	Loads scene group 0 + system data from a file.
		Print	Displays the print settings parameters in the Edit Pane.
Scene data		Edit	Displays the scene data editing screen in the Edit Pane.
		Copy	Copies the scene group data.
		Paste	Pastes the scene group data.
		Delete	Deletes the scene group data.
		Save to file	Saves the scene group data to a file.
		Load from file	Loads the scene group data from a file.
System data		Edit	Displays the system data editing screen in the Edit Pane.
		Copy	Copies the system data.
		Paste	Pastes the system data.
		Delete	Deletes the system data.
		Save to File	Saves the system data to a file.
		Load from File	Loads the system data from a file.
Tools	Communication Command Macro	Edit	Displays the communication command macro tool in the Edit Pane.
		Copy	Copies the communication command macro data.
		Paste	Pastes the communication command macro data.
		Delete	Deletes the communication command macro data.
		Save to file	Saves the communication command macro data to a file.
		Load from file	Loads the communication command macro data from a file.
	Calibration Support Tool	Edit	Displays the calibration support tool in the Edit Pane.
	User Data	Edit	Displays the user data tool in the Edit Pane.
	Save file	Edit	Displays the file saving tool in the Edit Pane.
	Image file save	Edit	Displays the image file save tool in the Edit Pane.
	Scene Control macro tool	Edit	Displays the scene macro tool in the Edit Pane.
	Scene Group Saving Destination Settings	Edit	Displays the setting tool for the scene group saving destination in the Edit Pane.
	Security settings	Edit	Displays the security setting tool in the Edit Pane.
	Registered image Manager	Edit	Displays the registered image manager in the Edit Pane.
	Update standard position tool	Edit	Displays the update standard position tool in the Edit Pane.
	Conversion scene group data tool	Edit	Displays the conversion scene group data tool in the Edit Pane.

Precautions for Correct Use

The displayed line number changes according to the operation mode. In the Multi-line Random Trigger operation mode, the set number of lines are displayed. In the Non-stop Adjustment operation mode, line 0 and 1 are displayed. For details on the operation mode, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

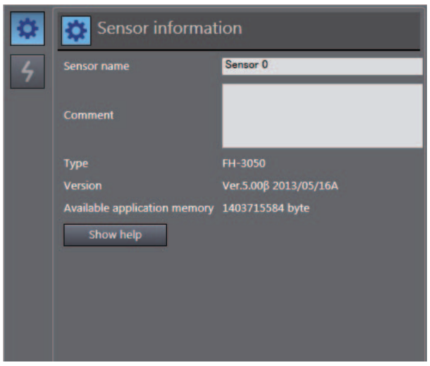
2-4-5 Edit Pane

This pane is for displaying and editing the detailed data of all items.

The following screens are provided.

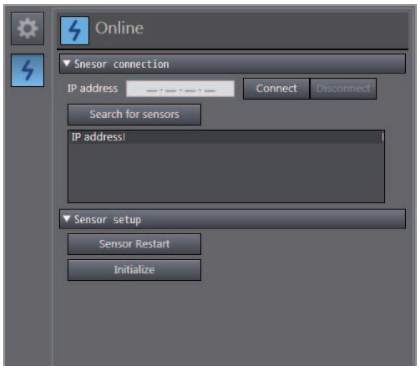
Screen	Description	Reference Page
Sensor connection screen	This allows you to access the sensor information, the connection with the sensor, the main screen of each line, etc.	P. 2-13
Monitor window	This allows you to check the measurement results.	P. 2-14
Scene maintenance window	This allows you to switch scenes or scene groups, and copy or delete a scene and a scene group. It also allows you to perform test measurement and check the measurement results.	P. 2-18
Scene data editing screen	This allows you to set the scene data.	P. 2-20
System data editing screen	This allows you to set the system data.	P. 2-22
Communication command macro screen	This allows you to set the communication command macro.	—
User Data tool screen	This allows you to edit the user data.	—
File Save Tool screen	This allows you to copy or move files between the RAMDisk/external memory of the FH vision sensor or between the RAMDisk/external memory and a computer. It also allows you to save the logging image stored in the vision sensor memory to the RAMDisk or external memory of the sensor, or to a computer.	P. 8-4
Calibration support tool screen	This allows you to check the calibration settings.	P. 8-3
Security settings	With this tool, it is possible to restrict access to FH Vision Image Sensor to specific users and user groups.	
Scene Group Saving Destination Settings	With this tool, it is possible to set the storage location of scene group data.	
Image file save	With this tool, it is possible to save logged images and image files that are saved in the Image Sensor to a RAM disk or external memory device in FH Vision Sensor, or to a computer.	
Registered image Manager	With this tool, it is possible to save images used for model registration and reference registration as registration images. The saved images can be used for re-registration and adjustment of reference positions.	
Update standard position tool	With this tool, it is possible to set or change the reference position for more than one processing unit that is specified in the measurement flow.	
Conversion scene group data tool	With this tool, it is possible to create a scene group that has more than or equal to 129 scenes.	
Scene Control macro tool	With this tool, it is possible to supplement and expand measurement flow and scene control.	

Sensor connection screen



Sensor name: Sensor 0
Type: FH-3050
Version: Ver.5.00β 2013/05/16A
Available application memory: 1403715584 byte

Sensor information
Comment
Show help



Online
▼ Snesor connection
IP address
Connect
Disconnect
Search for sensors
IP address
▼ Sensor setup
Sensor Restart
Initialize

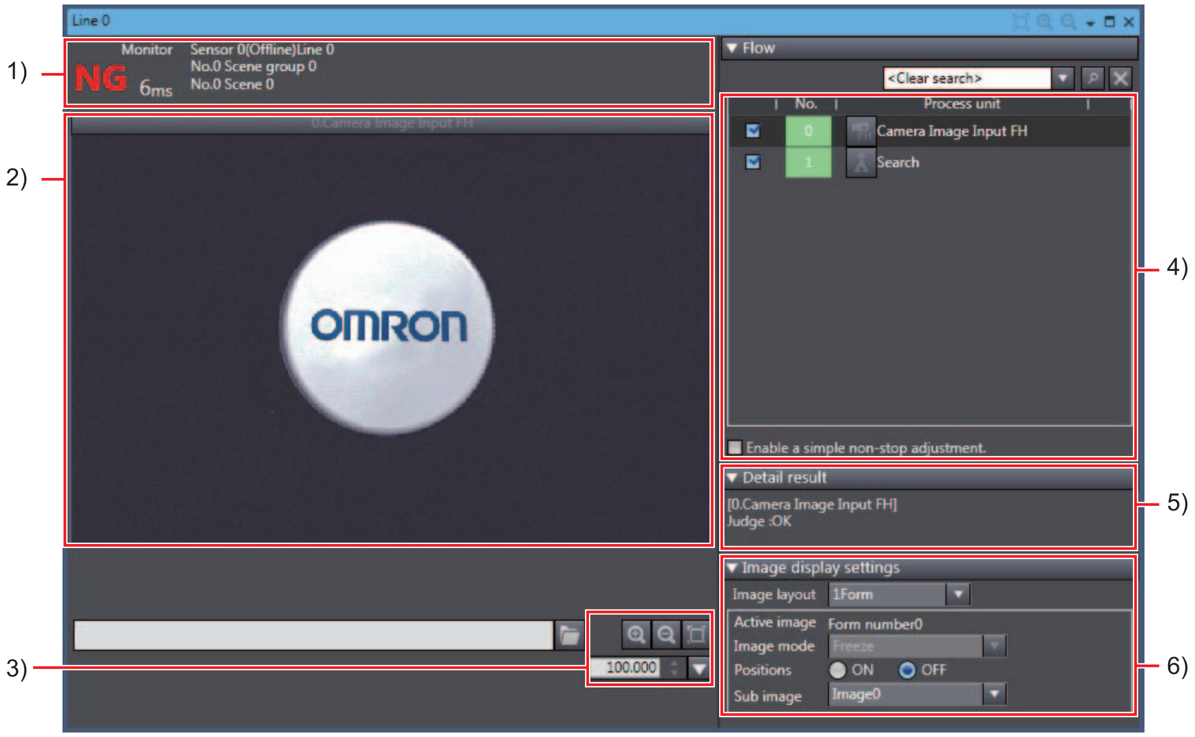
This allows you to access the sensor information, the connection with the sensor, the main screen of each line, etc.

Group	Item	Description
Sensor information	Sensor name	Allows you to change the sensor name.
	Comment	Allows you to enter a comment for the sensor.
	Type	Displays the sensor type information.
	Version	Displays the sensor version information.
	Available application memory	Displays the amount of available application memory.
Online	IP address	Sets the IP address of the sensor for online connections.
	Connect	Establishes an online connection to the sensor with the specified IP address.
	Disconnect	Disconnects the sensor currently connected with an online connection.
	Search for sensors	Searches for sensors within the same network.
	Sensor Restart	Restarts the sensor.
	Initialize	Initializes the sensor.

Additional Information

- For details on the settings in the sensor connection screen, refer to *3-2 Establishing an Online Connection with a Vision Sensor* on page 3-4.
- If there is already a different FH slave device in the project with an established online connection, you will not be able to establish an online connection for a new FH slave device. First, switch the other FH slave device from online to offline.

Monitor window



Sensor 0(Offline)Line 0
No.0 Scene group 0
No.0 Scene 0

No.	Process unit
0	Camera Image Input FH
1	Search

☐ Enable a simple non-stop adjustment.

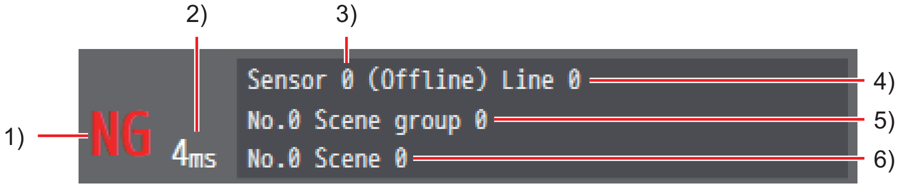
[0.Camera Image Input FH]
Judge :OK

Image layout: 1Form
Active image: Form number0
Image mode: Freeze
Positions: ○ ON ● OFF
Sub image: Image0

This allows you to check the measurement results.

No.	Screen Component	Description	Reference Page
1	Status display area	Allows you to access the sensor information, the connection with the sensor, the main screen of each line, etc.	P. 2-14
2	Image display area	Allows you to check the measurement results.	P. 2-15
3	Image size control section	Enlarges or reduces the selected image.	P. 2-15
4	Flow	Displays the processing flow for the relevant line or current scene.	P. 2-16
5	Detail result	Displays the results for the processing unit selected in the flow.	P. 2-17
6	Image display settings	Sets the displays settings for images displayed in the image display area.	P. 2-17

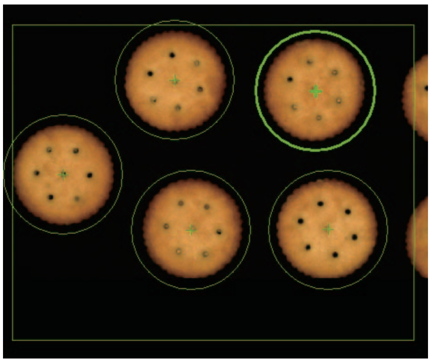
● Status display area



Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0

No.	Item	Description
1	Judgment result	Displays the judgment result (OK or NG).
2	Processing time	Displays the processing time for the most recent measurement process.
3	Sensor name and IP address	Displays the sensor name and IP address. When the sensor is offline, "Offline" is displayed instead of the IP address.
4	Line name	Displays the line for which information is currently being displayed.
5	Scene group name	Displays the current scene group number and scene group name.
6	Scene name	Displays the current scene number and scene name.

● Image display area

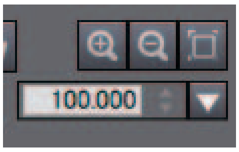


This displays the image and measurement result (graphic) for the processing unit selected in the flow display.

The settings for image display in the image display area can be changed in the Image display settings menu. For details on the Image display settings menu, refer to *Image display settings* on page 2-17.

While an image is displayed enlarged, you can change the display area by left-clicking and dragging the displayed image.

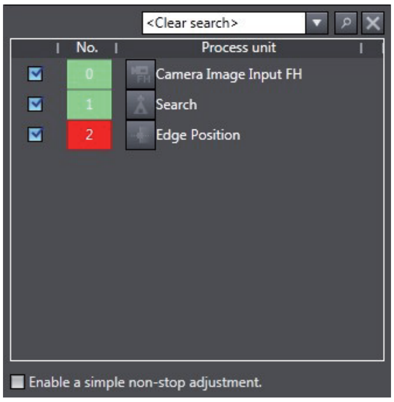
● Image size control section



This allows you to enlarge or reduce the selected image.

Button	Description
⊕	Enlarges the image. Image display is enlarged in 20% steps. (Upper limit: 1600%)
⊖	Reduces the image. Image display is reduced in 20% steps. (Lower limit: 1%)
⬚	Makes the image fit the display frame.
	Enlarges or reduces the image.

● Flow



	No.	Process unit
☑	0	Camera Image Input FH
☑	1	Search
☑	2	Edge Position

☐ Enable a simple non-stop adjustment.

This displays the processing flow for the relevant line or current scene.

If a processing unit displayed in the list is selected, the following display information is linked and so changes accordingly.

- Image display information
- Detailed result display information

If multiple images are displayed, the display information of the image with the focus on it changes.

If a processing unit is searched in the search area, the focus moves to the found processing unit.

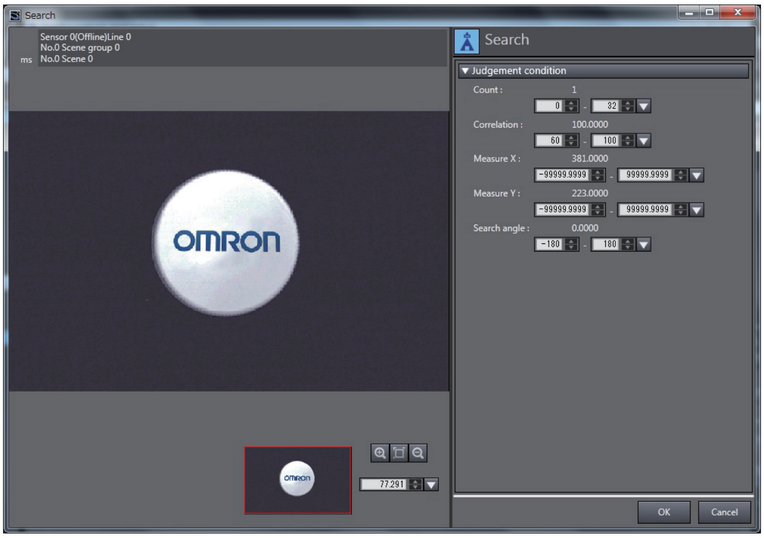
Item	Description
Search	Searches for the specified processing unit from within the processing flow.
Flow list	Displays the processing flow for the relevant line or current scene.

With this tool, it is possible to select a processing unit to be used for measurement. The measurements whose processing units with the checkmark removed will not be performed.

Check [Enable Simplified Non-stop Adjustment] to adjust the judgement conditions for each processing unit.

The judgement condition editing pane Opens by the following methods:

- Select [Edit] from the context menu of the relevant processing unit within the measurement flow
- Click the icon of the relevant processing unit



Sensor 0(Offline)Line 0
No.0 Scene group 0
No.0 Scene 0

Search

▼ Judgement condition

Count : 1
0 - 32

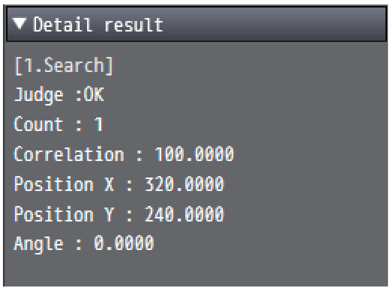
Correlation : 100.0000
60 - 100

Measure X : 381.0000
-99999.9999 - 99999.9999

Measure Y : 223.0000
-99999.9999 - 99999.9999

Search angle : 0.0000
-180 - 180

Detail result

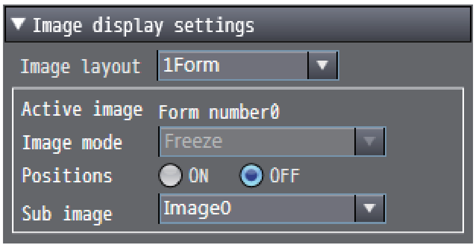


▼ Detail result

[1.Search]
Judge :OK
Count : 1
Correlation : 100.0000
Position X : 320.0000
Position Y : 240.0000
Angle : 0.0000

This displays the results for the processing unit selected in the flow.

Image display settings



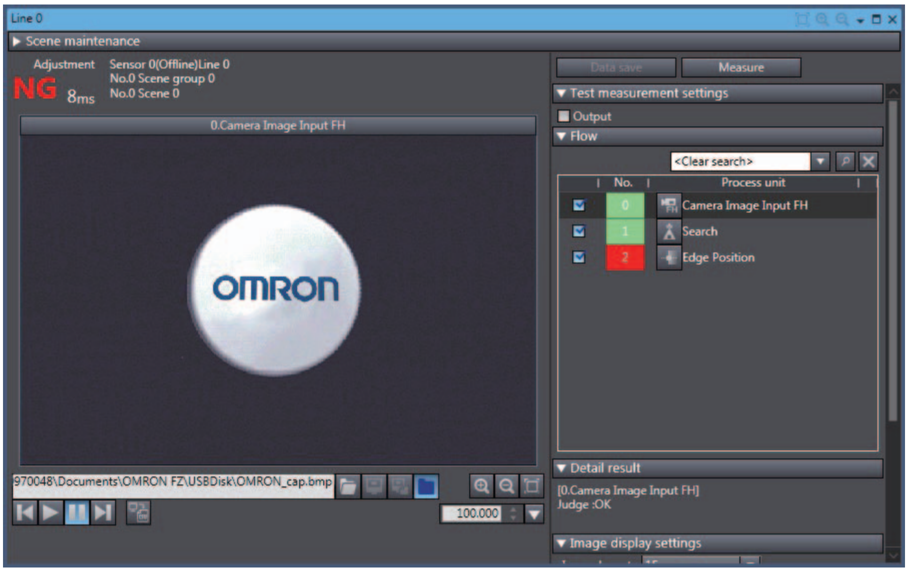
▼ Image display settings

Image layout: 1Form
Active image: Form number0
Image mode: Freeze
Positions: ○ ON ● OFF
Sub image: Image0

Item	Description
Image layout	Selects the number of images to display. Selection items: 1Form, 2Form, and 4Form
Image mode	Selects the image mode for the image with the focus on it. Selection items: Through, Freeze, and NG image
Positions	Selects position list display for the image with the focus on it. Selection items: OFF and ON
Sub image	Selects the sub image number for the image with the focus on it. Available sub-image numbers vary depending on the processing item. Select items: Image0, Image1,..., image31

This sets the displays settings for images displayed in the image display area.

Scene maintenance window


Line 0
Scene maintenance
Data save
Measure
Test measurement settings
Output
Flow
<Clear search>
No.
Process unit
Detail result
Image display settings
0.Camera Image Input FH
OMRON

Adjustment Sensor 0(Offline)Line 0
NG 8ms No.0 Scene group 0
No.0 Scene 0

970048\Documents\OMRON FZ\USBDisk\OMRON_cap.bmp

100.000

	No.	Process unit
☑	0	Camera Image Input FH
☑	1	Search
☑	2	Edge Position

[0.Camera Image Input FH]
Judge :OK

This allows you to copy, switch, and clear scene data and scene group data.

It also allows you to perform test measurement and check the measurement results.

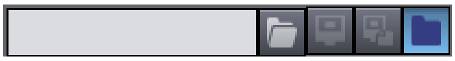
● Status display area

This is the same as in the monitor window. Refer to *Status display area on page 2-14*.

● Image display area

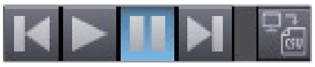
This is the same as in the monitor window. Refer to *Image display area* on page 2-15.

● File selection section



Button	Description
🖥	Displays camera images. Selection is not possible when offline.
🖥	Displays logging images. Selection is not possible when offline.
📁	Displays file images. When online, displays images in the RAMDisk or external memory of the sensor. When offline, displays images in the following folder on the computer. C:\Documents and Settings\<User name>\My Documents\OMRON FH
📂	Launch the File Explorer and select an image file.

● Image control section



Button	Description
▶	Performs continuous measurement of images. In the case of camera images, continuously measures and displays camera images. In the case of logging images, continuously measures and displays images in the logging folder. In the case of file images, continuously measures and displays images in the folder. When logging images and file images are selected, continuous measurement is stopped after all images are measured.
❚❚	Stops continuous measurement.
⏮	Measures and displays the previous image.
⏭	Measures and displays the next image.
CSV	Saves the latest image in a file.

● Image size control section

This is the same as in the monitor window. Refer to *Image size control section* on page 2-15.

● Data save

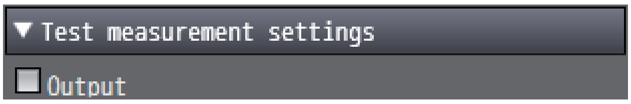
This saves the settings data to non-volatile memory of the FH sensor.

● Measure

Performs a single measurement.

The measurement process is performed for the image that is currently displayed.

● Test measurement settings



▼ Test measurement settings

☐ Output

Item	Description
Output	Outputs the measurement results to an external device when test measurement is performed.

● Flow

This is the same as in the monitor window. Refer to *Flow* on page 2-16.

● Detail result

This is the same as in the monitor window. Refer to *Detail result* on page 2-17.

● Image display settings

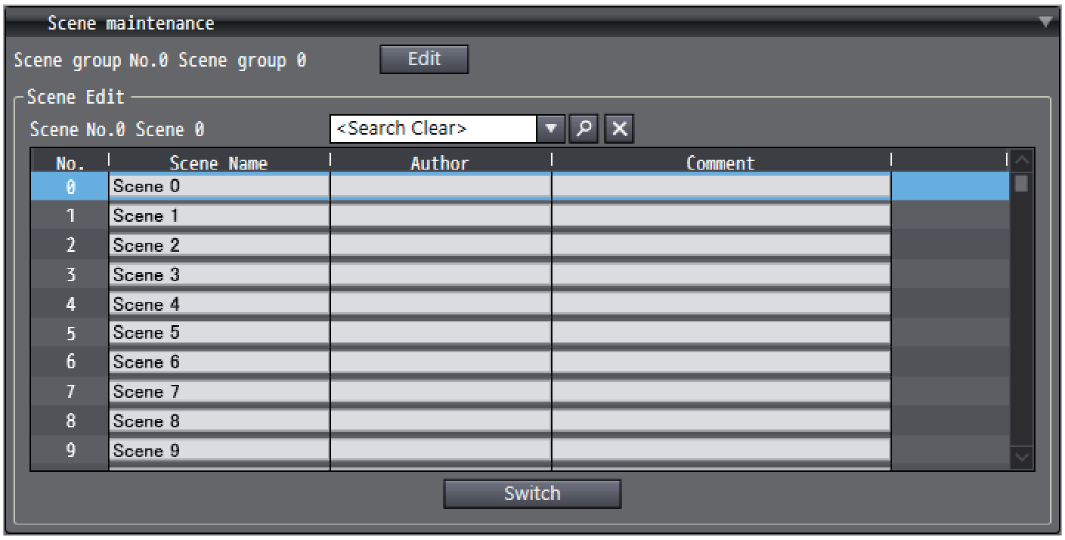
This is the same as in the monitor window. Refer to *Image display settings* on page 2-17.

- **Scene maintenance area**

Clicking the scene maintenance item bar opens the scene maintenance window.

This screen allows you to manage and switch the scene group data and scene data.

For details on the specifications, refer to *2-5 Basic Operations of Scene Data* on page 2-25.



Scene maintenance

Scene group No.0 Scene group 0

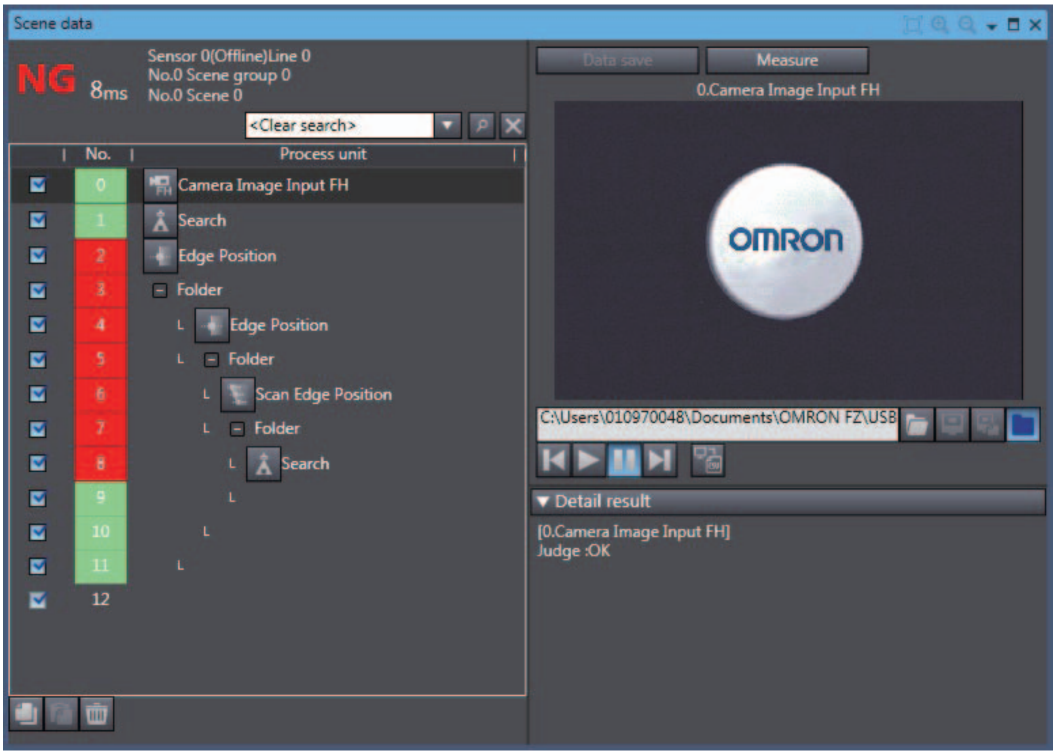
Scene Edit

Scene No.0 Scene 0

<Search Clear>

No.	Scene Name	Author	Comment
0	Scene 0		
1	Scene 1		
2	Scene 2		
3	Scene 3		
4	Scene 4		
5	Scene 5		
6	Scene 6		
7	Scene 7		
8	Scene 8		
9	Scene 9		

Scene data editing screen



Scene data

NG 8ms

Sensor 0(Offline)Line 0
No.0 Scene group 0
No.0 Scene 0

<Clear search>

No.	Process unit
0	Camera Image Input FH
1	Search
2	Edge Position
3	Folder
4	Edge Position
5	Folder
6	Scan Edge Position
7	Folder
8	Search
9	
10	
11	
12	

C:\Users\010970048\Documents\OMRON FZ\USB

Detail result

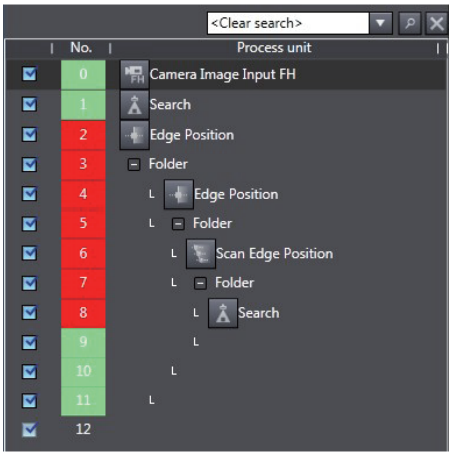
[0.Camera Image Input FH]
Judge :OK

This editing screen allows you to build the processing unit flow.

A new processing unit can be added to the flow by dragging and dropping any processing unit in the Toolbox on to the list.

It is also possible to check the image that is the measurement target, and the measurement results for each processing unit.

● Flow display



	No.	Process unit
☑	0	Camera Image Input FH
☑	1	Search
☑	2	Edge Position
☑	3	Folder
☑	4	Edge Position
☑	5	Folder
☑	6	Scan Edge Position
☑	7	Folder
☑	8	Search
☑	9	
☑	10	
☑	11	
☑	12	

This displays the processing flow for the relevant line or current scene.

Each editing process (adding, copying, deleting, etc.) of the processing units in the flow can be performed.

Item	Description
Search	Searches for the specified processing unit from within the processing flow.
Flow list	Displays the processing flow for the relevant line or current scene.

The registered processing units are displayed in the flow list.

With this tool, it is possible to select a processing unit to be used for measurement.

The measurements whose processing units with the checkmark removed will not be performed.

● Data save

This is the same as in the Scene maintenance screen. Refer to *Data save* on page 2-19.

● Transfer data

This transfers the settings for line 0 to line 1.

The button is displayed only when the operation mode is in Non-stop Adjustment Mode.

● Non-stop data transfer

This transfers the settings for line 1 to line 0.

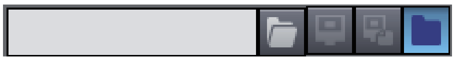
The button is displayed only when the operation mode is in Non-stop Adjustment Mode.

For details on “Transfer data” and “Non-stop data transfer”, refer to *Setting the Operation Mode - Non-stop Adjustment Mode* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

● Measure

This is the same as in the Scene maintenance screen. Refer to *Measure* on page 2-19.

● File selection section



This is the same as in the Scene maintenance screen. Refer to *File selection section* on page 2-18.

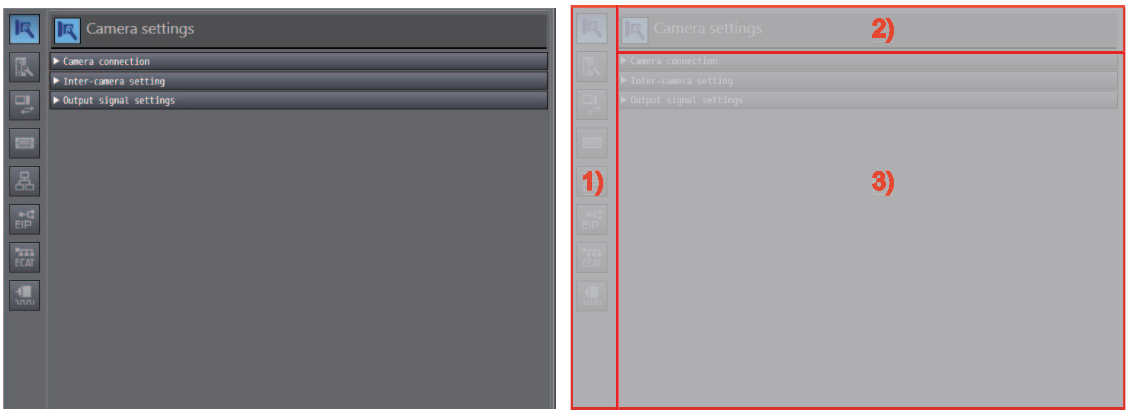
● Image control section

This is the same as in the Scene maintenance screen. Refer to *Image control section* on page 2-19.

● Detail result

This is the same as in the monitor window. Refer to *Detail result* on page 2-17.

System data editing screen


Camera settings
Camera connection
Inter-camera setting
Output signal settings
EIP
ECAT
1)
2)
3)

This editing screen allows you to set the system data.

System data is managed on a group basis and the editing items for each group are displayed by clicking the corresponding icon.

No.	Name
1	Icon
2	Group name display area
3	Editing item display area

For details on each group, refer to *8-5 Changing the System Environment* on page 8-8.

Tool settings editing screen

The tool settings editing screen displays the editing screens of the following tools.

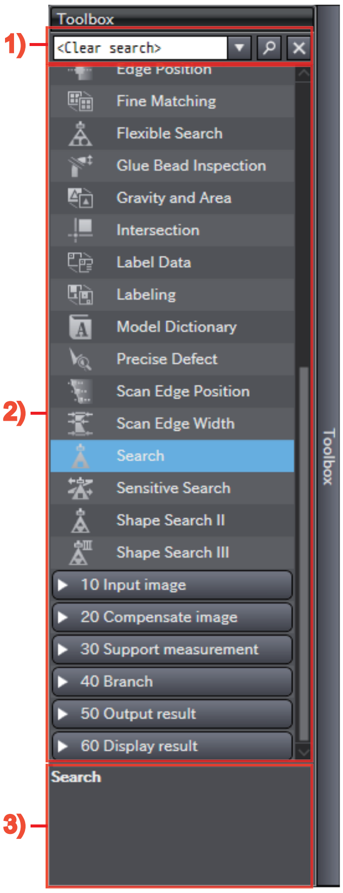
For details on each tool, refer to *Section 8 Other Useful Functions*.

Tool	Functional Overview
Communication command macro	Edits communication command macros.
Calibration support tool	Allows you to check the calibration settings.
User data tool	Allows you to edit the user data, set the initial settings, and enter a comment that describes the data.
File save tool	Saves the image data to a file.
Image file save	With this tool, it is possible to save logged images and image files that are saved in the Image Sensor to a RAM disk or external memory device in FH Vision Sensor, or to a computer.
Scene Control macro tool	With this tool, it is possible to supplement and expand measurement flow and scene control.
Scene Group Saving Destination Settings	With this tool, it is possible to set the storage location of scene group data.
Security settings	With this tool, it is possible to restrict access to FH Vision Image Sensor to specific users and user groups.
Registered image Manager	With this tool, it is possible to save images used for model registration and reference registration as registration images. The saved images can be used for re-registration and adjustment of reference positions.
Update standard position tool	With this tool, it is possible to set or change the reference position for more than one processing unit that is specified in the measurement flow.
Conversion scene group data tool	With this tool, it is possible to create a scene group that has more than or equal to 129 scenes.

2-4-6 Toolbox

The Toolbox displays a list of the processing units that can be used.

When the scene editing screen is displayed in the Edit Pane, you can add a processing unit by selecting any processing unit and dragging and dropping it onto the flow list in the scene editing screen.


Toolbox
1)
<Clear search>
Edge Position
Fine Matching
Flexible Search
Glue Bead Inspection
Gravity and Area
Intersection
Label Data
Labeling
Model Dictionary
Precise Defect
Scan Edge Position
Scan Edge Width
2)
Search
Sensitive Search
Shape Search II
Shape Search III
10 Input image
20 Compensate image
30 Support measurement
40 Branch
50 Output result
60 Display result
Search
3)
Toolbox

No.	Item	Operation
1	Processing item search window	Searches for processing items.
2	Processing item area	Displays the available processing units.
3	Guidance	Displays an overview of the selected processing unit.

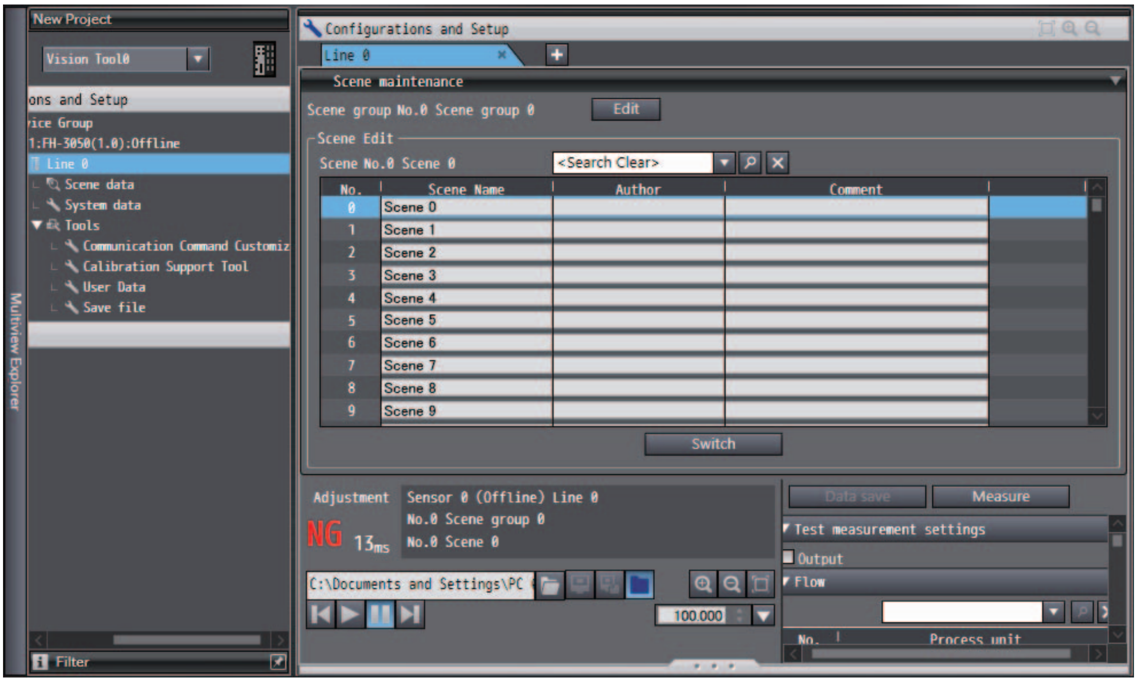
2-5 Basic Operations of Scene Data

An FH vision sensor can handle multiple scene data.

You can perform operations such as switching, copying, and deleting scenes with the scene maintenance functions in the scene maintenance window.

Right-click [Line X] in the Multiview Explorer and select [Scene maintenance screen] from the menu.

Click [Scene maintenance] and show [Scene maintenance] Pane.


New Project
Vision Tool0
ons and Setup
ice Group
1:FH-3050(1.0):Offline
Line 0
Scene data
System data
Tools
Communication Command Customiz
Calibration Support Tool
User Data
Save file
Multiview Explorer
Filter
Configurations and Setup
Line 0
Scene maintenance
Edit
Scene Edit
<Search Clear>
Switch
Data save
Measure
Test measurement settings
Output
Flow
NG
13ms
100.000
No.
Process unit

Scene group No.0 Scene group 0

Scene No.0 Scene 0

No.	Scene Name	Author	Comment
0	Scene 0		
1	Scene 1		
2	Scene 2		
3	Scene 3		
4	Scene 4		
5	Scene 5		
6	Scene 6		
7	Scene 7		
8	Scene 8		
9	Scene 9		

Adjustment
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0

C:\Documents and Settings\PC

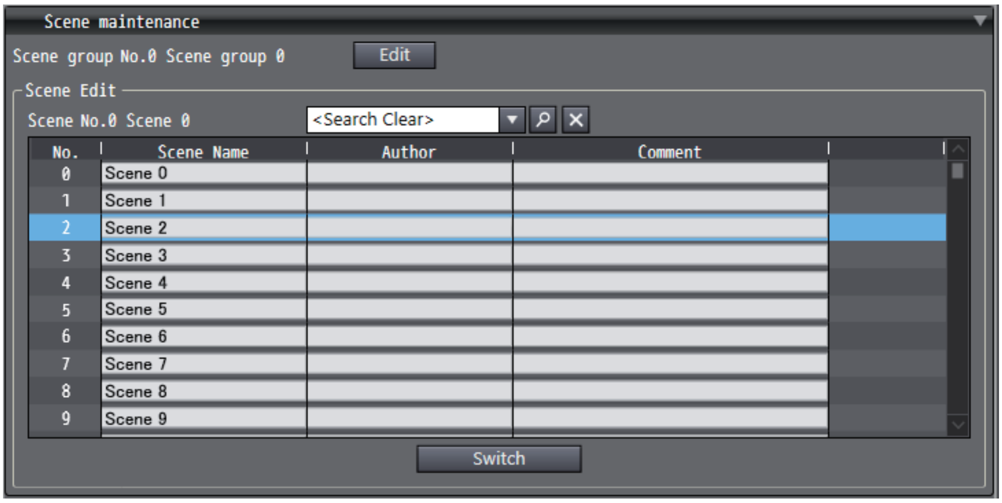
Additional Information

Project data that was edited offline can be transferred to the FH vision sensor.

For details on how to transfer project data, refer to *3-3 Synchronizing Project Data and Sensor Settings Data* on page 3-8.

2-5-1 Switching Scenes

You can switch scenes by selecting the target scene in the scene list and then clicking the [Switch] button.



Scene group No.0 Scene group 0

Scene No.0 Scene 0

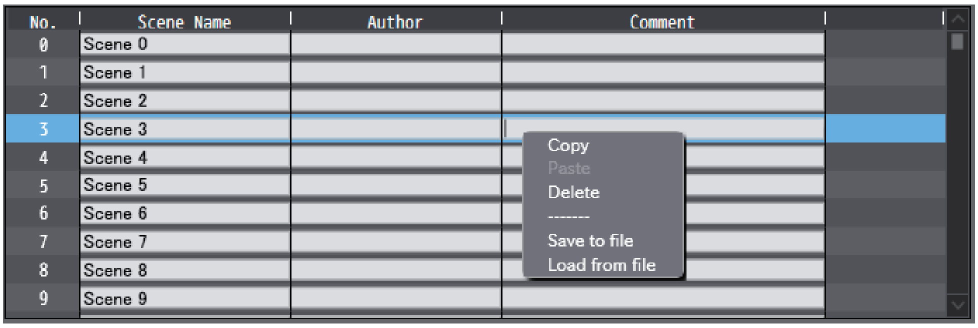
No.	Scene Name	Author	Comment
0	Scene 0		
1	Scene 1		
2	Scene 2		
3	Scene 3		
4	Scene 4		
5	Scene 5		
6	Scene 6		
7	Scene 7		
8	Scene 8		
9	Scene 9		

When scene switching is performed, the scene data editing screen is closed automatically if it is open in the Edit Pane.

2-5-2 Managing Scenes

Right-clicking a target scene in the scene list displays the following menu.

Select the menu item for the operation you wish to perform.

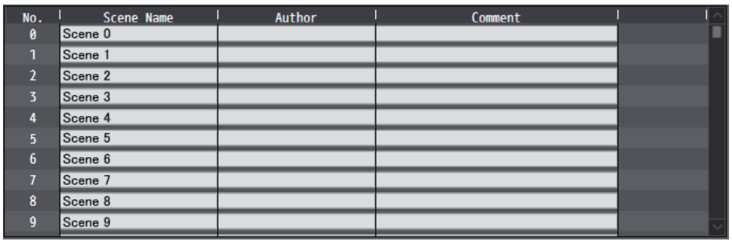


No.	Scene Name	Author	Comment
0	Scene 0		
1	Scene 1		
2	Scene 2		
3	Scene 3		
4	Scene 4		
5	Scene 5		
6	Scene 6		
7	Scene 7		
8	Scene 8		
9	Scene 9		

Item	Description
Copy	Copies the selected scene.
Paste	Pastes the copied scene.
Delete	Clears the selected scene.
Save to file	Saves the selected scene as a scene data file to the folder on the computer. The save file format can be selected from either binary scene data (file extension: SCN), or CSV. Select CSV to output a list of settings with the “Set/Get” attribute to the saved file. (Settings with the “Set only” and “Get only” attribute cannot be output.) The function to output CSV files outputting by selecting “Save to file” and the “Settings download and upload tools” function for the FH vision sensor are the same. For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).
Load from file	When online, loads a scene data file in the external memory of the sensor to the selected scene. When offline, loads the scene data file of the computer folder. A scene data file in CSV format can also be loaded.

2-5-3 Entering Scene Information

The scene list displays the following information.



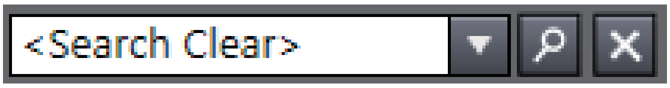
No.	Scene Name	Author	Comment
0	Scene 0		
1	Scene 1		
2	Scene 2		
3	Scene 3		
4	Scene 4		
5	Scene 5		
6	Scene 6		
7	Scene 7		
8	Scene 8		
9	Scene 9		

Item	Description
Scene Name	Displays the scene name. (Maximum of 15 characters)
Author	Displays the author name. (Maximum of 15 characters)
Comment	Displays the comment. (Maximum of 255 characters)

Each item in the list can be directly edited.

2-5-4 Searching for a Scene

You can search for a scene in the list by entering any scene name in the search box and then clicking the search button (🔍). Clicking the search clear button (✕) clears the search results.

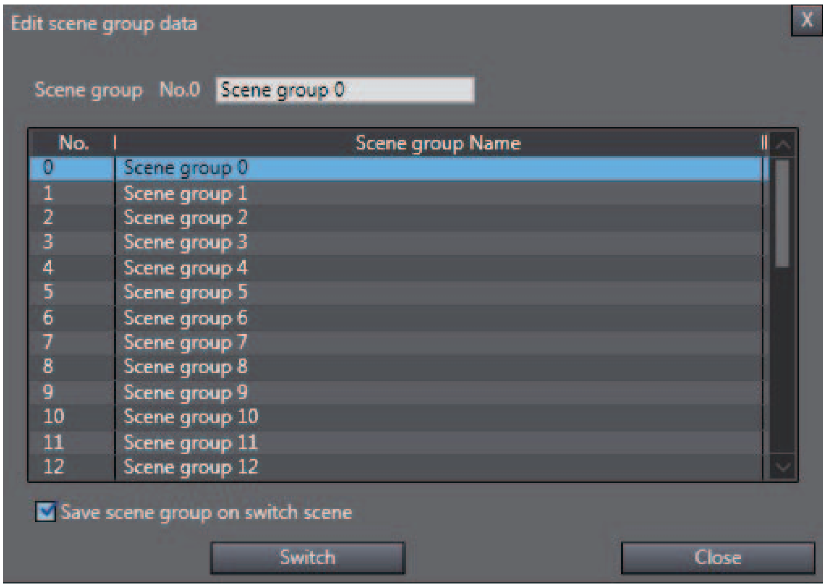


<Search Clear>

2-5-5 Switching Scene Groups

Clicking the scene group editing button displays the scene group editing window.

You can switch scene groups by selecting the target scene group in the list and then clicking the [Switch] button.



Edit scene group data

Scene group No.0 Scene group 0

No.	Scene group Name
0	Scene group 0
1	Scene group 1
2	Scene group 2
3	Scene group 3
4	Scene group 4
5	Scene group 5
6	Scene group 6
7	Scene group 7
8	Scene group 8
9	Scene group 9
10	Scene group 10
11	Scene group 11
12	Scene group 12

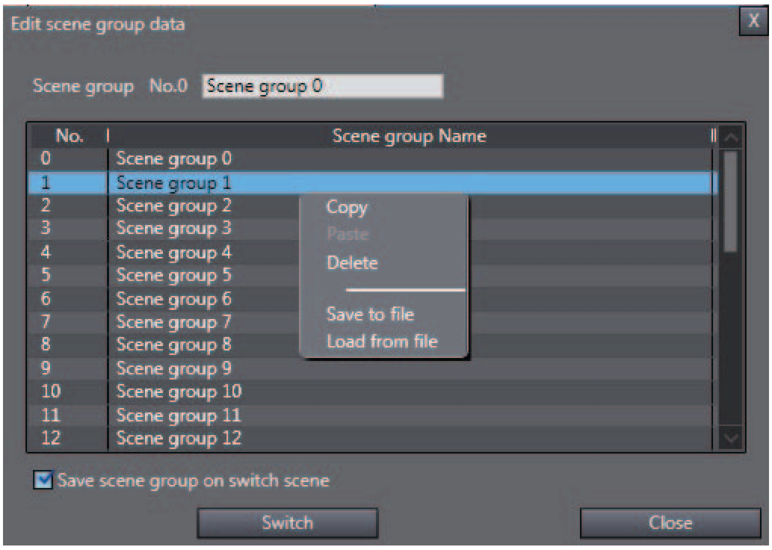
☑ Save scene group on switch scene

When scene switching is performed, the scene data editing screen is closed automatically if it is open in the Edit Pane.

2-5-6 Managing Scene Groups

Right-clicking a target scene group in the scene group list in the scene group editing window displays the following menu.

Select the menu item for the operation you wish to perform.


Edit scene group data
X
Scene group No.0 Scene group 0
No.
Scene group Name
0 Scene group 0
1 Scene group 1
2 Scene group 2
3 Scene group 3
4 Scene group 4
5 Scene group 5
6 Scene group 6
7 Scene group 7
8 Scene group 8
9 Scene group 9
10 Scene group 10
11 Scene group 11
12 Scene group 12
Copy
Paste
Delete
Save to file
Load from file
☑ Save scene group on switch scene
Switch
Close

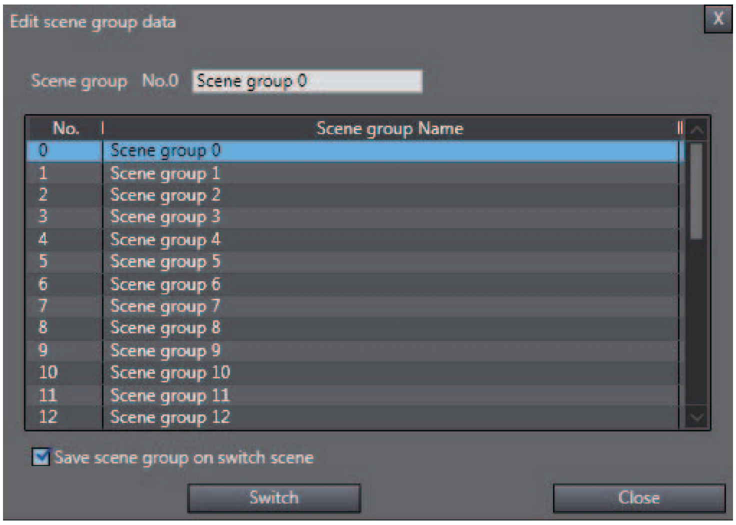
Item	Description
Copy	Copies the selected scene group.
Paste	Pastes the copied scene group.
Delete	Clears the selected scene group.
Save to file	When online, saves the selected scene group as a file to the RAMDisk or USB memory of the sensor. When offline, saves it to the following folder on the computer. C:\Documents and Settings\<User name>\My Documents\OMRON FH
Load from file	When online, loads a scene data file in the RAMDisk or USB memory of the sensor to the selected scene group. When offline, loads the scene data file in the following folder on the computer. C:\Documents and Settings\<User name>\My Documents\OMRON FH

2-5-7 Entering Scene Group Information

The scene group list displays the following information.

Item	Description
Scene group Name	Displays the scene group name.

The current scene group name can be edited.



Scene group No.0 Scene group 0

No.	Scene group Name
0	Scene group 0
1	Scene group 1
2	Scene group 2
3	Scene group 3
4	Scene group 4
5	Scene group 5
6	Scene group 6
7	Scene group 7
8	Scene group 8
9	Scene group 9
10	Scene group 10
11	Scene group 11
12	Scene group 12

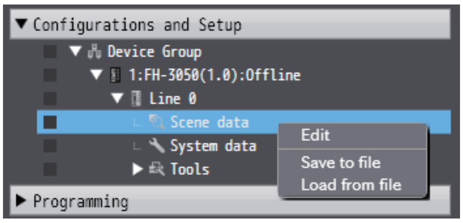
☑ Save scene group on switch scene

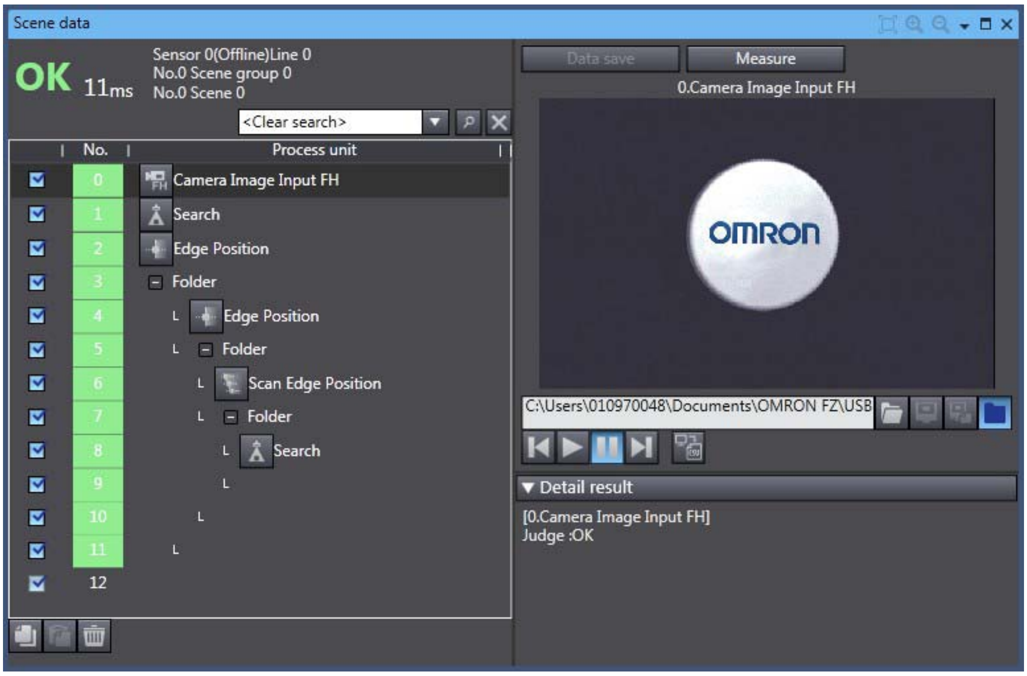
2-6 Basic Operations of Flow Editing

This section describes how to edit the flow.

Edit the flow in the scene data editing screen. For details on the scene data editing screen, refer to *Scene data editing screen* on page 2-20.

You can open the scene data editing screen in the Edit pane by double-clicking scene data, or by right-clicking it and selecting [Edit] from the menu.

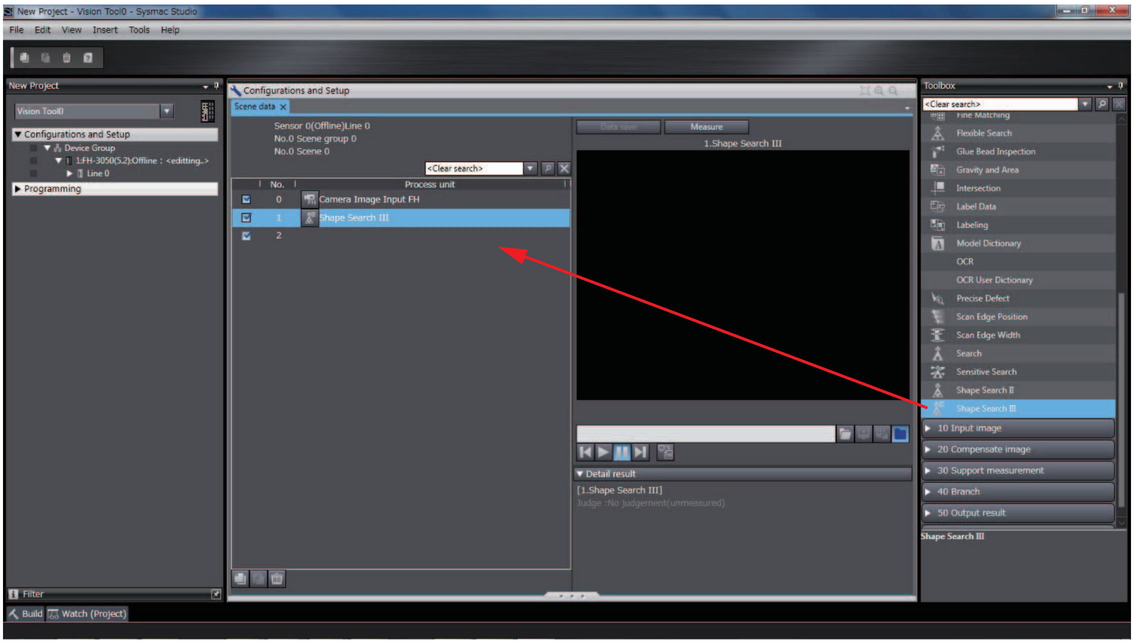

Configurations and Setup
Device Group
1:FH-3050(1.0):Offline
Line 0
Scene data
System data
Tools
Programming
Edit
Save to file
Load from file


Scene data
OK 11ms
Sensor 0(Offline)Line 0
No.0 Scene group 0
No.0 Scene 0
<Clear search>
No.
Process unit
0 Camera Image Input FH
1 Search
2 Edge Position
3 Folder
4 Edge Position
5 Folder
6 Scan Edge Position
7 Folder
8 Search
9
10
11
12
Data save
Measure
0.Camera Image Input FH
OMRON
C:\Users\010970048\Documents\OMRON FZ\USB
Detail result
[0.Camera Image Input FH]
Judge :OK

2-6-1 Adding a Processing Unit

When you wish to add a new processing unit to the flow, first select any processing unit from the Toolbox.

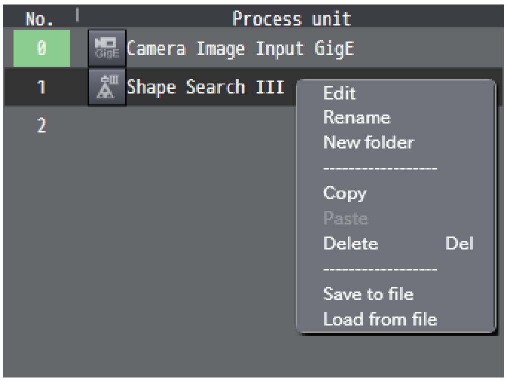
Then drag the selected processing unit to the place you wish to insert it in the flow list.


New Project - Vision Tool0 - Sysmac Studio
File Edit View Insert Tools Help
New Project
Vision Tool0
Configurations and Setup
Device Group
1:FH-3050(5.2):Offline : <editting..>
Line 0
Programming
Configurations and Setup
Scene data
Sensor 0(Offline)Line 0
No.0 Scene group 0
No.0 Scene 0
<Clear search>
No.
Process unit
0 Camera Image Input FH
1 Shape Search III
2
Measure
1.Shape Search III
Detail result
[1.Shape Search III]
Judge :No judgement(unmeasured)
Toolbox
<Clear search>
Fine Matching
Flexible Search
Glue Bead Inspection
Gravity and Area
Intersection
Label Data
Labeling
Model Dictionary
OCR
OCR User Dictionary
Precise Defect
Scan Edge Position
Scan Edge Width
Search
Sensitive Search
Shape Search II
Shape Search III
10 Input image
20 Compensate image
30 Support measurement
40 Branch
50 Output result
Shape Search III
Filter
Build
Watch (Project)

2-6-2 Managing Processing Units

Right-clicking a target processing unit in the flow list displays the following menu.

Select the menu item for the operation you wish to perform.



Item	Description
Edit[*1]	Opens the processing unit editing screen.
Rename	Changes the name of the processing unit.
New folder	Inserts a folder unit.
Copy	Copies the selected processing unit.
Paste	Pastes the copied processing unit.
Delete	Clears the selected processing unit.
Save to file	Saves the settings data of the processing unit to a file. When online, saves it to the RAMDisk or USB memory of the sensor. When offline, saves it to the following folder on the computer. C:\Documents and Settings\<User name>\My Documents\OMRON FH
Load from file	Loads the settings data of the processing unit from a file. When online, loads the file in the RAMDisk or USB memory of the sensor. When offline, loads the file in the following folder on the computer. C:\Documents and Settings\<User name>\My Documents\OMRON FH

*1. If the processing item is not supported in the edit operation, the following message appears.
"The ProcItem has not been supported."

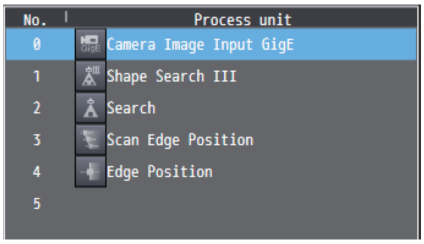
Menu buttons

Button	Description
⧉	Copies the processing unit with the focus on it.
📋	Pastes the copied processing unit.
🗑	Deletes the processing unit with the focus on it.

Display is hierarchical in the flow list when the following processing units are used.

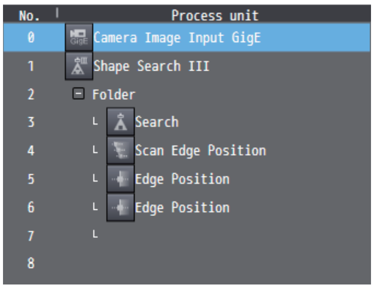
- Folder unit
- Parallelize unit
- Parallelize task unit

<No folder unit>



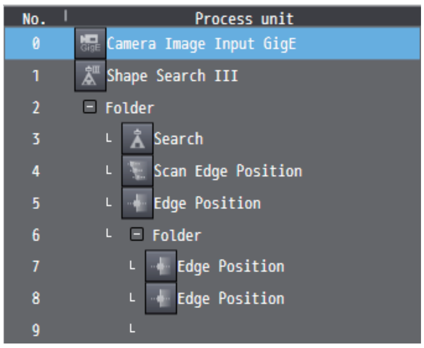
No.	Process unit
0	Camera Image Input GigE
1	Shape Search III
2	Search
3	Scan Edge Position
4	Edge Position
5	

<Folder unit layer 1>



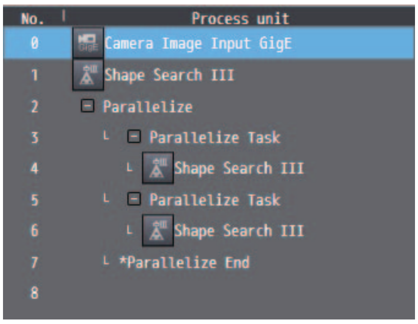
No.	Process unit
0	Camera Image Input GigE
1	Shape Search III
2	⊟ Folder
3	└ Search
4	└ Scan Edge Position
5	└ Edge Position
6	└ Edge Position
7	└
8	

<Folder unit layer 2>



No.	Process unit
0	Camera Image Input GigE
1	Shape Search III
2	⊟ Folder
3	└ Search
4	└ Scan Edge Position
5	└ Edge Position
6	└ ⊟ Folder
7	└ Edge Position
8	└ Edge Position
9	└

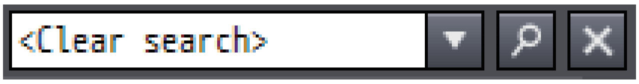
<Parallelize unit>



No.	Process unit
0	Camera Image Input GigE
1	Shape Search III
2	⊟ Parallelize
3	└ ⊟ Parallelize Task
4	└ Shape Search III
5	└ ⊟ Parallelize Task
6	└ Shape Search III
7	└ *Parallelize End
8	

2-6-3 Searching for a Processing Unit

You can search for a processing unit in the flow list by entering any processing unit name in the search box and then clicking the search button (🔍). Clicking the search clear button (✕) clears the search results.



<Clear search>

2-7 Function List

2-7-1 List of Functions Provided with the FH Tool

The following shows the functions provided with the FH tool and the usage conditions.

Classification	Item	Function		When Online Editing	When Offline Editing
Project management	Menu Item	File	Close	○	○
			Save	○	○
			Save As	○	○
			Save As New Number	○	○
			Import	x	○
			Export	x	○
			Exit	○	○
		Edit	Copy	x	○
			Paste	x	○
			Delete	○	○
		View	Multivew Explorer	○	○
			Toolbox	○	○
			Reset Window Layout	○	○
		Insert	Controller	○	○
			Displacement Sensor	○	○
			Vision Sensor	○	○
		Tools	Option	○	○
		Help	Help Contents	○	○
			About Sysmac Studio	○	○
Edit operations	Toolbar	Copy		x	○
		Paste		x	○
		Delete		○	○
		Help		○	○

Classification	Item	Function			When Online Editing	When Offline Editing
Parameter settings	Multiview	Device Group		Add | FH	○	○
				Rename	○	○
		Type		Edit	○	○
				Change version	x	○
				Delete	○	○
				Restart	○	○
				Online	x	○
				Offline	○	x
				End Offline Editor	x	○
		Line X		Monitor window	○	○
				Scene maintenance window	○	○
				Save data	○	x
				Rename	○	○
				Save to file	○	○
				Load from file	○	○
				Print	○	○
		Scene data		Edit	○	○
				Copy	x	○
				Paste	x	○
				Delete	○	○
				Save to file	○	○
				Load from file	○	○
		System data		Edit	○	○
				Save to file	○	○
				Load from file	○	○
Tools	Multiview	Tools	Communication Command Macro	Edit	○	○
				Copy	x	○
				Paste	x	○
				Delete	x	○
				Save to file	○	○
				Load from file	○	○
			Calibration Support Tool	Edit	○	○
			User Data	Edit	○	○
			Save file	Edit	○	○
			Image file save	Edit	○	○
			Scene Control macro tool	Edit	○	○
			Scene Group Saving Destination Settings	Edit	○	○
			Security settings	Edit	○	○
			Registered image Manager	Edit	○	○
			Update standard position tool	Edit	○	○
			Conversion scene group data tool	Edit	○	○

Classification	Item	Function		When Online Editing	When Offline Editing
Measurement control	Edit Pane	Online measurement	Camera images	○	x
			File images * File images in the vision sensor	○	x
			Logging images	○	x
			File images * File images in the computer	x	○
		Simulation[1]	Integrated simulation	x	○

[1] Simulation is available only when editing an NJ Project.

2-7-2 Comparison with FH Series Unit Functions

The following table shows the main differences between the functions provided with an FH series device and the FH tool.

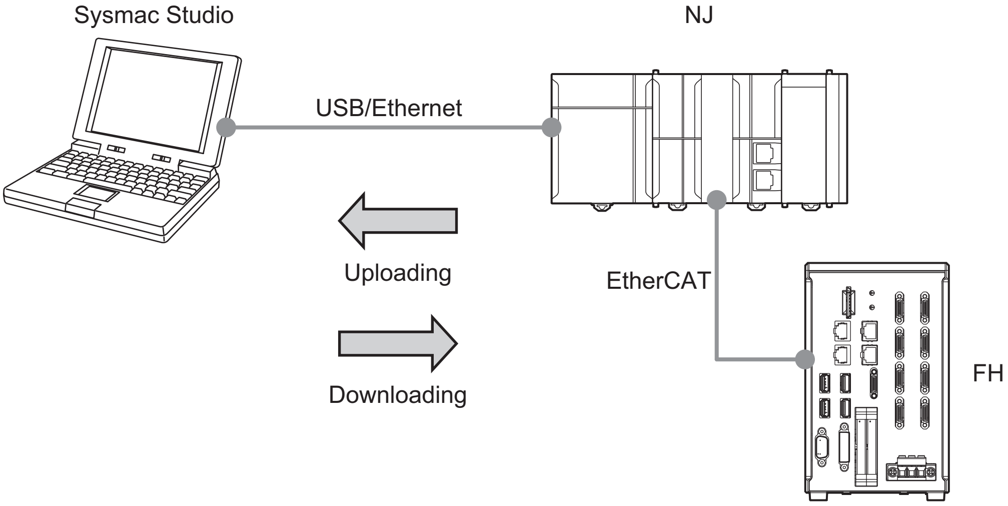
Classification	Item	Sysmac Studio	FH
Project management	Data management for a single FH vision sensor	○	○
	Data management for all devices	○	x
	Screen customization and screen layout control	x	○
	Creating and displaying dedicated dialog boxes	x	○
Tools	Communications command macro	○	○
	File save	○	○
	Calibration Support Tool	○	○
	NG analyzer	x	○
	User data tool	○	○
	Security settings	○	○
	Downloading and uploading setting values	○	○
	Image file saving	○	○
	Registered image management tool	○	○
	Flow viewer	x	○
	Reference position batch conversion tool	○	○
	Scene group data conversion tool	○	○
	Scene Group Saving Destination Settings	○	○
	Scene Control macro tool	○	○
Simulation	Single simulation	○	○
	Integrated simulation	○	x

2-8 Precautions on Synchronization through an NJ-series Controller

The contents of the Sysmac Studio project data and the data being synchronized vary depending on the connection method (i.e., Ethernet direct connection or connection through an NJ-series Controller) between the FH sensor controller and the computer that runs the Sysmac Studio. Particularly, the settings data for the FH sensor controller cannot be synchronized via an NJ-series Controller.

This section describes precautions on performing the system synchronization from the System Studio via an NJ-series Controller.

For the overview, refer to *1-2-2 Project Data Handling in Different System Configurations* on page 1-5.



2-8-1 Synchronized Project Data

The Sysmac Studio manages the settings data for the FH sensor controller as a part of the project data. (Refer to *1-2-1 Project data* on page 1-4.)

The data size of the FH sensor controller settings varies depending on the created scenes and measurement flows. (Refer to *Memory Usage Guidance For Processing Items* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).) Because of this, the settings data for the FH sensor controller cannot be synchronized via an NJ-series Controller.

There are following methods to synchronize the settings data for the FH sensor controller with the data in the Sysmac Studio.

(1) Directly connect the FH sensor controller to the computer that runs the Sysmac Studio via Ethernet

Refer to *3-3 Synchronizing Project Data and Sensor Settings Data* on page 3-8.

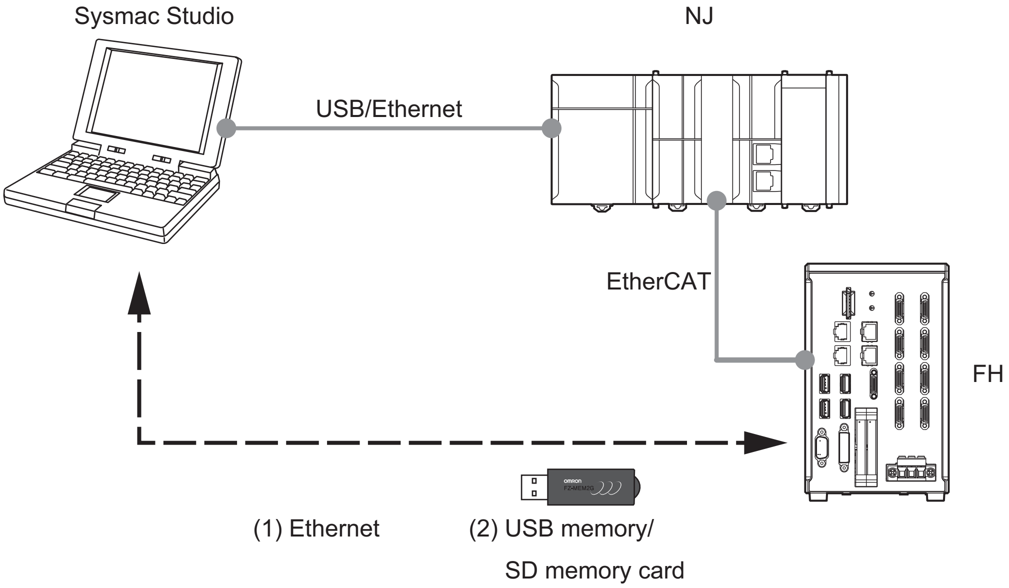
(2) Use the external memory

The procedures are described in the following sections:

2-8-2 Saving and Loading the Settings Data for the FH Sensor Controller on page 2-41

2-8-3 Transferring Data from the Sysmac Studio on page 2-42

2-8-4 Transferring Data to the Sysmac Studio on page 2-44



2-8-2 Saving and Loading the Settings Data for the FH Sensor Controller

This section describes procedures for saving and loading the settings data for the FH sensor controller using the external memory.

● Saving and loading the settings data for the FH sensor controller

The following procedures describe how to save and load the settings data for the FH sensor controller that is in the FH sensor controller to the external memory. Save and load following four types of the settings data individually.

(1) System + Scene group 0 data

Refer to the following:

- *Saving Settings Data to the Controller RAM Disk or an External Memory Device* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340)
- *Loading Settings Data from the Controller RAM Disk or an External Memory Device to the Sensor Controller* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340)

(2) Data for scene groups 1 to 31

Refer to the following:

- *Saving Settings Data to the Controller RAM Disk or an External Memory Device* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340)
- *Loading Settings Data from the Controller RAM Disk or an External Memory Device to the Sensor Controller* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340)

(3) Communications command macro data

Refer to *Saving and Loading Programs in the Communication Command Macro* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

(4) Security settings data

Refer to *Saving/Loading/Deleting the Security Settings* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

Precautions for Correct Use

- If the FH sensor controller is in the Multi-line Random-trigger Mode, the settings data for the FH sensor controller must be saved and loaded for each individual line.
- During saving, do not restart, turn OFF the power supply, or remove the external memory device. Data will be corrupted and the system will not work properly at the next start-up.

  Be particularly careful if you use [Save to file] for [System + Scene group 0 data] because the data to be saved will also be saved to the flash memory in the Controller at the same time.

2-8-3 Transferring Data from the Sysmac Studio

This section describes the following:

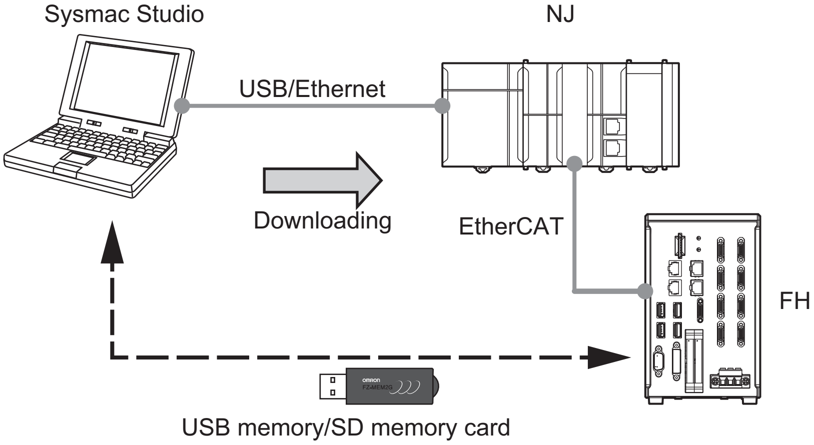
- How to download the Sysmac Studio data to the FH sensor controller when synchronizing the Sysmac Studio and the FH sensor controller,
- Procedures for transferring data from the Sysmac Studio via the external memory.

Use the following procedures to synchronize the data from the Sysmac Studio.

1 Save the settings data for the FH sensor controller that is in the Sysmac Studio to the external memory.

2 Establish an online connection with the NJ-series Controller to transfer the data from the Sysmac Studio to the NJ-series Controller.

3 Use the external memory that holds the data saved in Step 1 to load the data to the FH sensor controller.



1 Procedures for saving the settings data for the FH sensor controller that is in the Sysmac Studio (Sysmac Studio to external memory)

Save the data in the Sysmac Studio to the external memory. Then use the external memory to transfer the data to the FH sensor controller. Refer to *2-4-4 Multiview Explorer* on page 2-10.

Save following four types of the settings data individually.

(1) System + Scene group 0 data

Refer to *8-3 Using the File Save Tool* on page 8-4.

(2) Data for scene groups 1 to 31

Refer to *8-3 Using the File Save Tool* on page 8-4.

(3) Communications command macro data

Refer to *8-1 Using the Command Customize Setting Tool* on page 8-2.

(4) Security settings data

Refer to *8-7 Using the Security Setting Tool* on page 8-11.

Precautions for Correct Use

If the FH sensor controller is in the Multi-line Random-trigger Mode, the settings data for the FH sensor controller must be saved for each individual line.

2 Procedures for transferring the data from the Sysmac Studio to the NJ-series Controller (Sysmac Studio to NJ-series Controller)

Establish an online connection with the NJ-series Controller to transfer the data from the Sysmac Studio to the NJ-series Controller. Refer to *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

(1) Establish an online connection between the NJ-series Controller and the computer that runs the Sysmac Studio.

(2) Select [Synchronize] from the [Controller] Menu.

(3) Select [Transfer to Sensor].

3 Procedures for transferring the data from the external memory to the FH sensor controller (external memory to FH sensor controller)

Use the external memory that holds the settings data to load the data to the FH sensor controller. Refer to *2-8-2 Saving and Loading the Settings Data for the FH Sensor Controller* on page 2-41.

2-8-4 Transferring Data to the Sysmac Studio

This section describes the following:

- How to transfer the data in the NJ-series Controller and the FH sensor controller to the Sysmac Studio when synchronizing the Sysmac Studio and the FH sensor controller,
- Procedures for transferring data to the Sysmac Studio via the external memory.

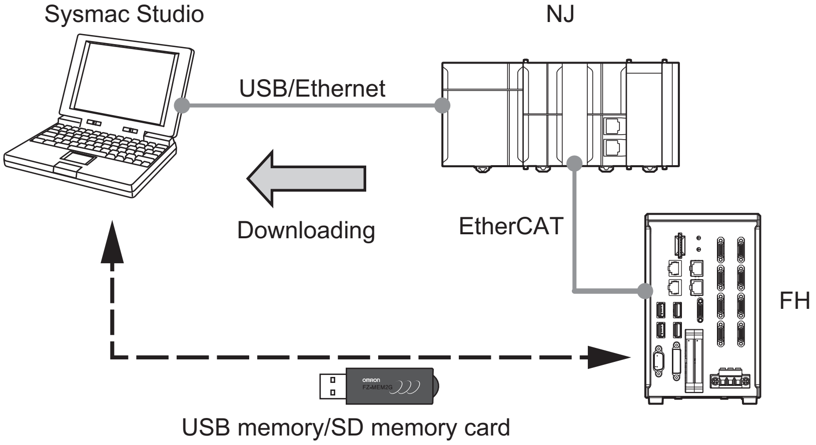
Use the following procedures to synchronize the data from the Sysmac Studio.

1 Save the settings data for the FH sensor controller in the FH sensor controller from to the external memory.

2 Establish an online connection with the NJ-series Controller and transfer the data from the NJ-series Controller to the Sysmac Studio.

3 Use the external memory that holds the data saved in Step 1 to load the data to the Sysmac Studio.

4 Save the Sysmac Studio project.



1 Saving the Settings Data for the FH Sensor Controller (FH sensor controller to external memory)

The following section describes the procedures for saving the settings data for the FH sensor controller to the external memory.

2-8-2 Saving and Loading the Settings Data for the FH Sensor Controller on page 2-41

2 Procedures for transferring the data from the NJ-series Controller to the Sysmac Studio (NJ-series Controller to Sysmac Studio)

Refer to *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

(1) Establish an online connection between the NJ-series Controller and the computer that runs the Sysmac Studio.
(2) Select [Synchronize] from the [Controller] Menu.
(3) Select [Transfer to computer].

Precautions for Correct Use

- Do not restart the FH sensor controller or edit the settings data for the FH sensor controller from the Sysmac Studio at the timing when [Transfer to computer] is executed.

  The values for the settings data that the FH sensor controller manages will be reset to the factory defaults immediately after the execution of [Transfer to computer]. With default values set to the settings data, editing the settings data updates the associated I/O Map with the default values.

  Be sure not to restart the FH sensor controller before the completion of the data transfer.

  Also, be sure not to save the project before restart of the FH sensor controller.
- If the synchronization with the NJ-series Controller is performed again after the data transfer to the Sysmac Studio, " ❗ " in the EtherCAT configurations will be displayed.

  This is because the settings data for the FH sensor controller has been updated.

  If you follow the procedures above, the Sysmac Studio project data matches the data in the NJ-series Controller.

3 Procedures for transferring the settings data for the FH sensor controller to the Sysmac Studio (external memory to Sysmac Studio)

Loads the settings data for the FH sensor controller that is in the external memory to the Sysmac Studio. Refer to *2-4-4 Multiview Explorer* on page 2-10.

Load following four types of the settings data individually.

(1) System + Scene group 0 data
(2) Data for scene groups 1 to 31
(3) Communications command macro data

    Refer to *8-1 Using the Command Customize Setting Tool* on page 8-2.
(4) Security settings data

    Refer to *8-7 Using the Security Setting Tool* on page 8-11.

Precautions for Correct Use

If the FH sensor controller is in the Multi-line Random-trigger Mode, the settings data for the FH sensor controller must be loaded for each individual line.

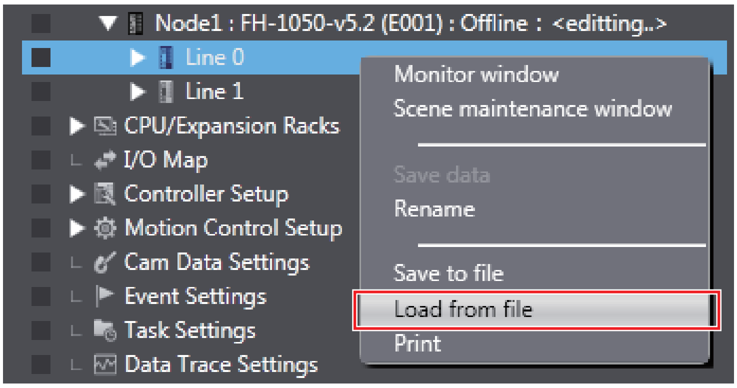
The following procedures describe how to load the system data and the scene group data.

1 Insert the external memory to the computer that runs the Sysmac Studio.

2 In the Multiview Explorer tree, select the FH sensor controller to which you want to load the data.

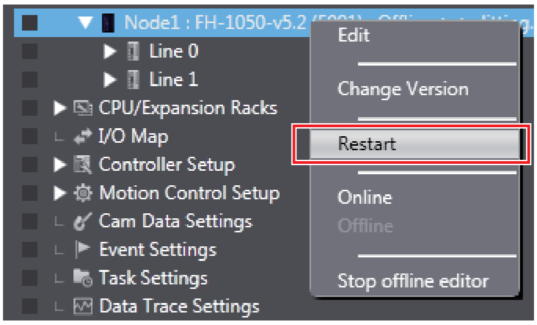
3 Right-click the selected FH sensor controller and select [Edit] from the menu.

4 Right-click the line number and select [Load from file] from the menu.


Node1 : FH-1050-v5.2 (E001) : Offline : <editting..>
Line 0
Line 1
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings
Event Settings
Task Settings
Data Trace Settings
Monitor window
Scene maintenance window
Save data
Rename
Save to file
Load from file
Print

5 Right-click the FH sensor controller and select [Restart] from the menu.

This operation shows the line with the selected line number in the tree.


Node1 : FH-1050-v5.2
Line 0
Line 1
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings
Event Settings
Task Settings
Data Trace Settings
Edit
Change Version
Restart
Online
Offline
Stop offline editor

6 Repeat steps 4 and 5 for each line.

7 After completion of data transfer for all lines for all FH sensor controllers, save the Sysmac Studio project.

3

Connecting with a Vision Sensor

This section describes how to establish a connection with a vision sensor.

3-1 Adding FH Series Vision Sensor on the Network to a Project 3-3

3-2 Establishing an Online Connection with a Vision Sensor 3-4

3-2-1 Establishing an Online Connection from the Sensor Connection Screen 3-4

3-2-2 Establishing an Online Connection from the Multiview Explorer 3-6

3-3 Synchronizing Project Data and Sensor Settings Data 3-8

3-3-1 Transferring Project Data to the Sensor 3-8

3-3-2 Transferring Setting data in the Sensor to a Project 3-9

3-4 Ending a Connection with a Vision Sensor 3-11

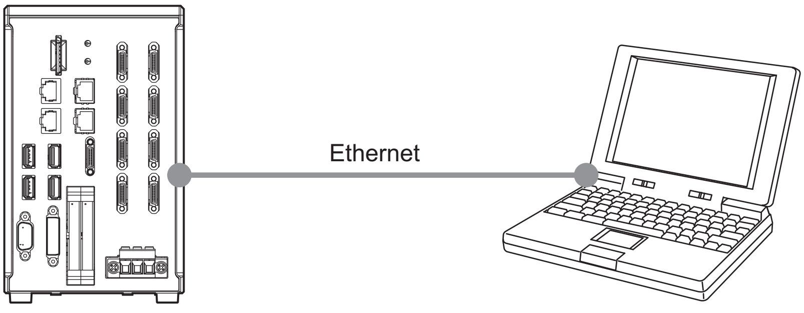
3-4-1 Ending a Connection in the Sensor Connection Screen 3-11

3-4-2 Ending a Connection in the Multiview Explorer 3-11

3-5 Logging in to a Registered User's Account 3-12

To establish an online connection with FH vision sensor, configure settings and make adjustments, connect directly by Ethernet. You can also connect via a hub or router.

It is not possible to set and adjust FH vision sensor via NJ series controller.



Precautions for Correct Use

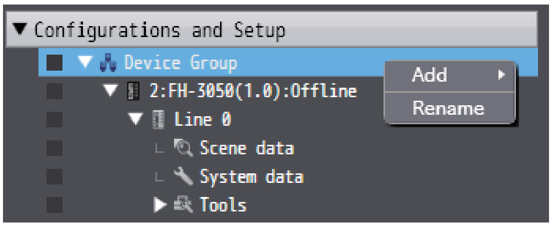
- If there is already a different FH slave device in the project with an established online connection, you will not be able to establish an online connection for a new FH slave device. First, switch the other FH slave device from online to offline.
- To configure account settings with an FH vision sensor, you will need to log in to your account while online.

  For details on logging in to your account, refer to *3-5 Logging in to a Registered User's Account* on page 3-12.

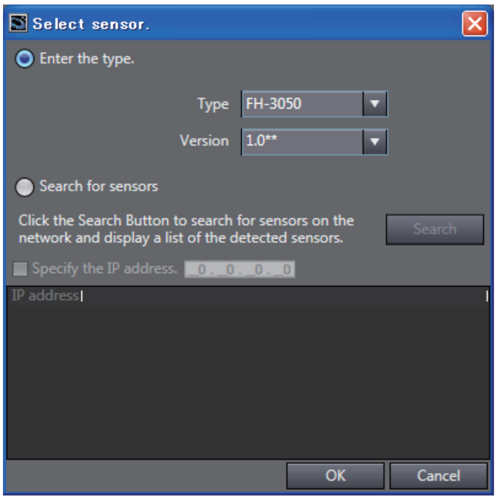
3-1 Adding FH Series Vision Sensor on the Network to a Project

When creating a new project or adding FH vision sensor to a project, select FH vision sensor on the network.

When connecting to the FH vision sensor, right-click [Device Group] in the Multiview Explorer and then select [Add | FH].


▼ Configurations and Setup
▼ Device Group
▼ 2:FH-3050(1.0):Offline
▼ Line 0
Scene data
System data
▶ Tools
Add ▸
Rename

The following sensor selection screen appears.


Select sensor.
● Enter the type.
Type
Version
○ Search for sensors
Search
☐ Specify the IP address.
IP address
OK
Cancel

Type: FH-3050

Version: 1.0**

Click the Search Button to search for sensors on the network and display a list of the detected sensors.

When establishing an online connection, click [Search for sensors] and then click the [Search] button. The found sensors are displayed in a list. Select the sensor you wish to connect to and then click the [OK] button.

If you know the IP address of the sensor you wish to connect to beforehand or will connect to a sensor via a router, select the [Specify the IP address.] check box and then enter the IP address in [IP address]. After input is complete, click the [OK] button.

Precautions for Correct Use

If there is already a different FH slave device in the project with an established online connection, you will not be able to select the [Search for sensors] option.

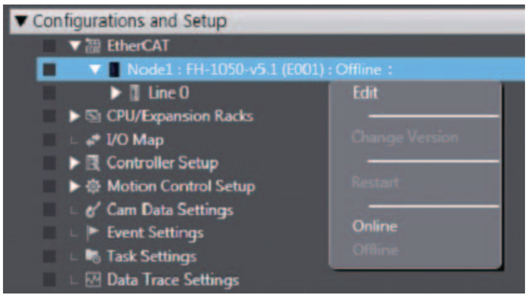
3-2 Establishing an Online Connection with a Vision Sensor

Connect with FH vision sensor on the network.

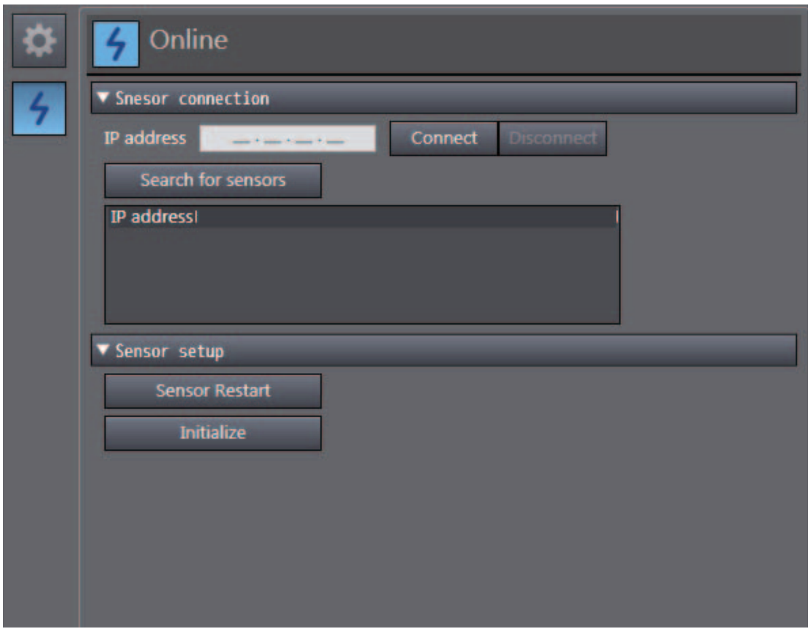
3-2-1 Establishing an Online Connection from the Sensor Connection Screen

You can open the sensor connection screen in the Edit Pane by double-clicking the type name of the FH vision sensor in the Multiview Explorer or by right-clicking it and selecting [Edit] from the menu.

<Multiview Explorer>


Configurations and Setup
EtherCAT
Node1 : FH-1050-v5.1 (E001) : Offline :
Line 0
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings
Event Settings
Task Settings
Data Trace Settings
Edit
Change Version
Restart
Online
Offline

<Sensor connection screen>


Online
Snesor connection
IP address
_ . _ . _ . _
Connect
Disconnect
Search for sensors
IP address
Sensor setup
Sensor Restart
Initialize

Click the [Search for sensors] button of [Online] - [Sensor connection] to display a list of the IP addresses of the FH vision sensors on the same network. Select the FH vision sensor you wish to connect to and then click the [Connect] button.

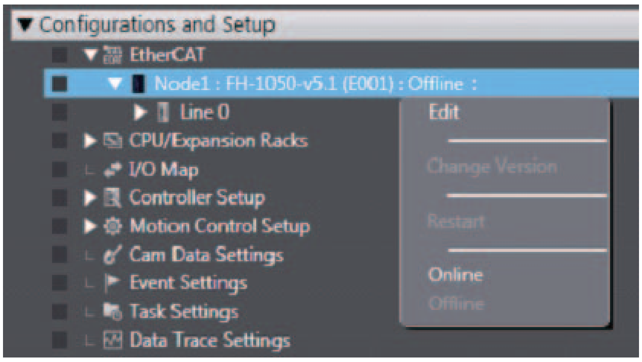
You can also directly enter an IP address in the IP address field.

If you wish to connect with an FH vision sensor via a router, directly enter the IP address and then click the [Connect] button.

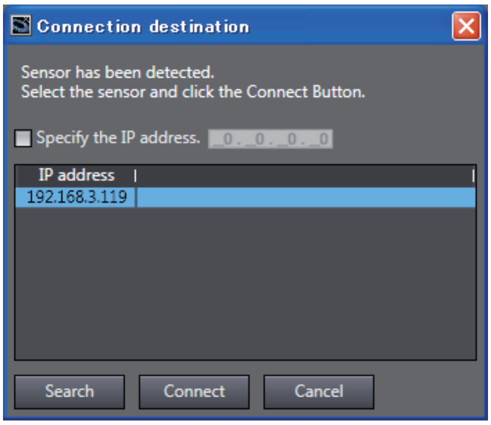
3-2-2 Establishing an Online Connection from the Multiview Explorer

If the FH vision sensor to be connected has already been set, you can establish an online connection with it by right-clicking the type name of the FH vision sensor in the Multiview Explorer and then selecting [Online].

For details on setting the FH vision sensor to be connected, refer to *3-2-1 Establishing an Online Connection from the Sensor Connection Screen* on page 3-4.


Configurations and Setup
EtherCAT
Node1 : FH-1050-v5.1 (E001) : Offline :
Line 0
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings
Event Settings
Task Settings
Data Trace Settings
Edit
Change Version
Restart
Online
Offline

If the FH vision sensor that has already been set cannot be found, the automatically detected FH vision sensors are displayed in a list. Select the FH vision sensor you wish to connect to.


Sensor has been detected.
Select the sensor and click the Connect Button.

☐ Specify the IP address. 0 . 0 . 0 . 0

IP address
192.168.3.119

Connection destination
Search
Connect
Cancel

Precautions for Correct Use

- When you connect vision sensors to Sysmac Studio by the network, set the same network addresses for all the vision sensors and computer where Sysmac Studio is running.

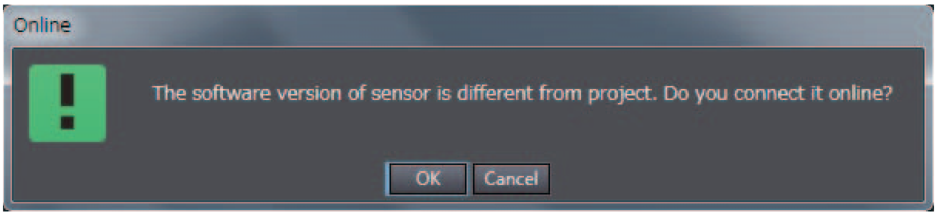
  e.g., when the Ethernet settings set for the vision sensors are as follows, the network addresses of the vision sensors and the computer are "10.5.5.*."

  IP address: 10.5.5.100

  Subnet mask: 255.255.255.0
- If you plan to control the vision sensor from Sysmac Studio over the network, you will need to have the Remote Operation option for the Communication module for the FH sensor controller set to ON (initial setting).

  For details on how to configure the settings, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

Attempting to connect the FH vision sensor whose sensor version does not match the version registered in the project, the following message appears.



Online

The software version of sensor is different from project. Do you connect it online?

If the versions do not match, online editing cannot properly be performed and editing the data offline cannot be performed after editing it online in some cases. Make sure to connect the FH vision sensor whose sensor version matches.

3-3 Synchronizing Project Data and Sensor Settings Data

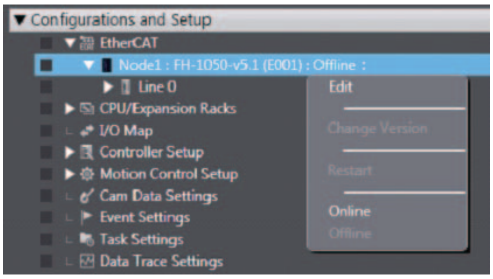
3-3-1 Transferring Project Data to the Sensor

Project data and settings data for the FH vision sensor can be synchronized together.

1 Establish an online connection for the vision sensor.

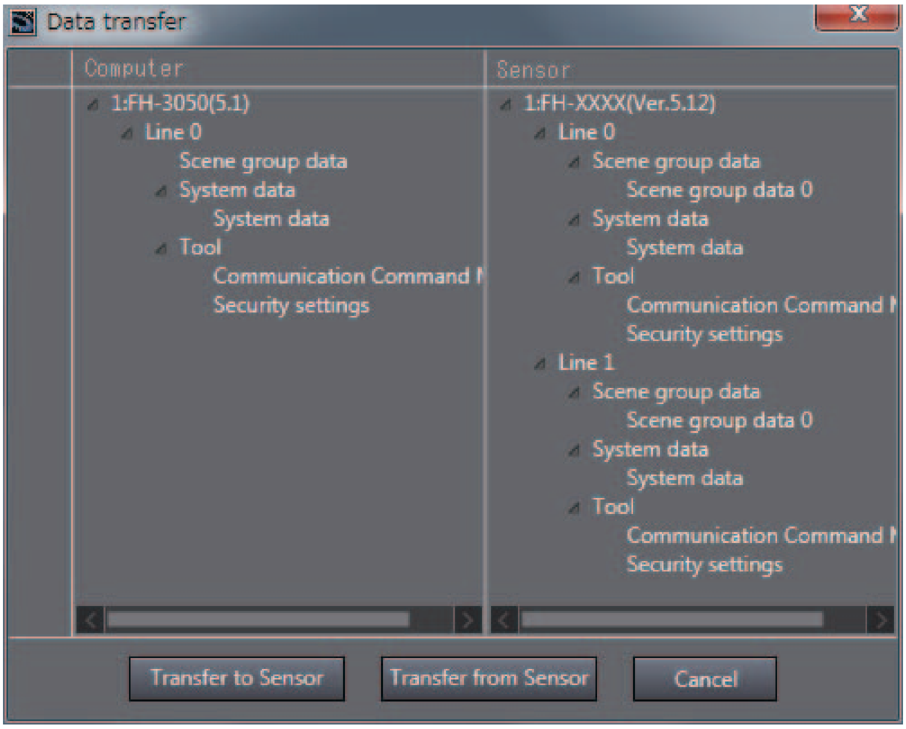
Establish an online connection for the FH vision sensor that you wish to synchronize to the project data.

For details, refer to *3-2 Establishing an Online Connection with a Vision Sensor* on page 3-4.


Configurations and Setup
EtherCAT
Node1 : FH-1050-v5.1 (E001) : Offline :
Line 0
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings
Event Settings
Task Settings
Data Trace Settings
Edit
Change Version
Restart
Online
Offline

2 Select the data that you wish to have transferred.

The [Data transfer] window will appear once you are online.


Data transfer
Computer
1:FH-3050(5.1)
Line 0
Scene group data
System data
System data
Tool
Communication Command
Security settings
Sensor
1:FH-XXXX(Ver.5.12)
Line 0
Scene group data
Scene group data 0
System data
System data
Tool
Communication Command
Security settings
Line 1
Scene group data
Scene group data 0
System data
System data
Tool
Communication Command
Security settings
Transfer to Sensor
Transfer from Sensor
Cancel

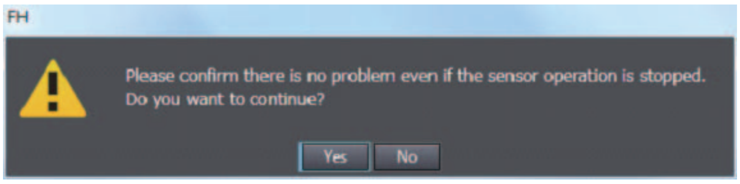
Precautions for Correct Use

The following data cannot be transferred. Manually edit them after the data transfer so that the transferred data will be consistent to the original data.

- Scene Group Saving Destination Settings data
- Registered image in the Registered image Manager

3 Initiate the data transfer.

To transfer the project data to the FH vision sensor, select [Transfer to Sensor]. Choose [Yes] when the below message appears to begin the transfer.

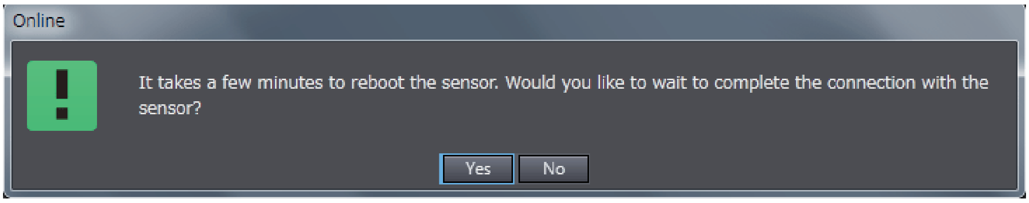


Please confirm there is no problem even if the sensor operation is stopped.
Do you want to continue?

Once the transfer is finished, restart the FH vision sensor.

Select [Yes] to wait until the FH vision sensor restarts.

Select [No] to switch to offline before the restart.

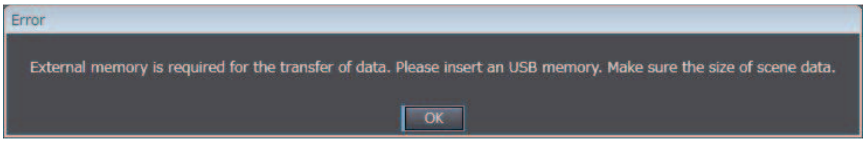

Online
Yes
No

It takes a few minutes to reboot the sensor. Would you like to wait to complete the connection with the sensor?

Precautions for Correct Use

To transfer settings data with large file sizes, you will need to use a compatible external memory device that can be inserted into the FH vision sensor.

If the below message appears to indicate that the file size is too large for a normal transfer, insert a compatible memory device with enough free space to proceed.

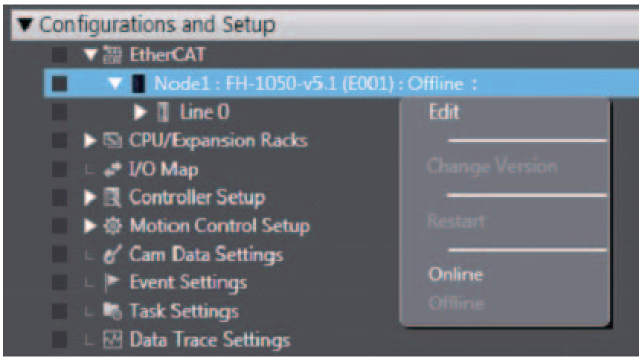


External memory is required for the transfer of data. Please insert an USB memory. Make sure the size of scene data.

3-3-2 Transferring Setting data in the Sensor to a Project

1 Establish an online connection for the vision sensor.

Establish an online connection for the FH vision sensor that you wish to transfer its data to the project. For details, refer to *3-2 Establishing an Online Connection with a Vision Sensor* on page 3-4.


Configurations and Setup
EtherCAT
Node1 : FH-1050-v5.1 (E001) : Offline :
Line 0
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings
Event Settings
Task Settings
Data Trace Settings
Edit
Change Version
Restart
Online
Offline

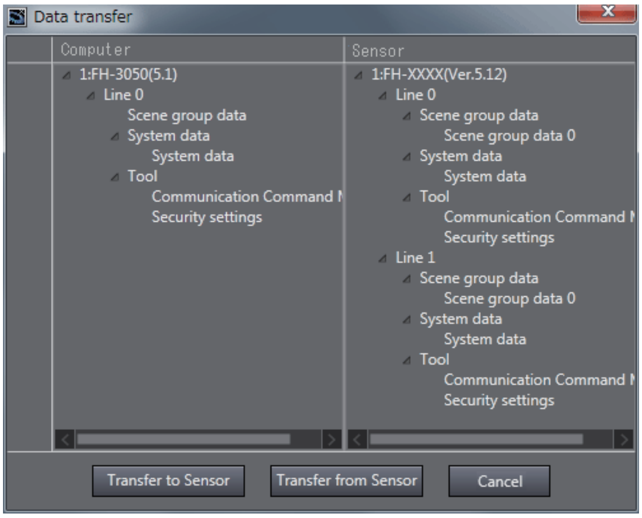
2 Switch to offline.

After establishing an online connection, switch the FH vision sensor to offline.

3 Select the data that you wish to have transferred.

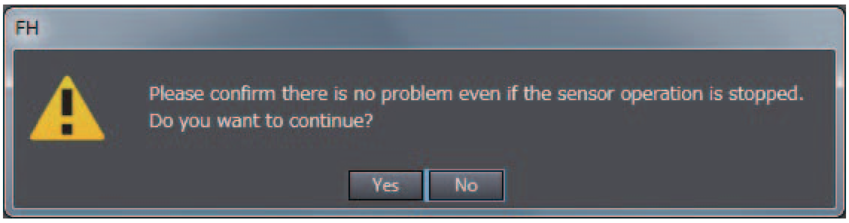
The [Data transfer] window is displayed.

Select the check box of the data that you wish to have transferred.


Data transfer
Computer
1:FH-3050(5.1)
Line 0
Scene group data
System data
System data
Tool
Communication Command I
Security settings
Sensor
1:FH-XXXX(Ver.5.12)
Line 0
Scene group data
Scene group data 0
System data
System data
Tool
Communication Command I
Security settings
Line 1
Scene group data
Scene group data 0
System data
System data
Tool
Communication Command I
Security settings
Transfer to Sensor
Transfer from Sensor
Cancel

4 Initiate the data transfer.

To transfer the setting data in FH vision sensor to the project, select [Transfer to computer]. Choose [Yes] when the below message appears to begin the transfer.

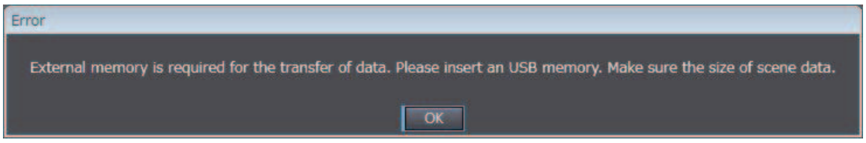


Please confirm there is no problem even if the sensor operation is stopped.
Do you want to continue?

Precautions for Correct Use

To transfer settings data with large file sizes, you will need to use a compatible external memory device that can be inserted into the FH vision sensor.

If the below message appears to indicate that the file size is too large for a normal transfer, insert a compatible memory device with enough free space to proceed.



External memory is required for the transfer of data. Please insert an USB memory. Make sure the size of scene data.

3-4 Ending a Connection with a Vision Sensor

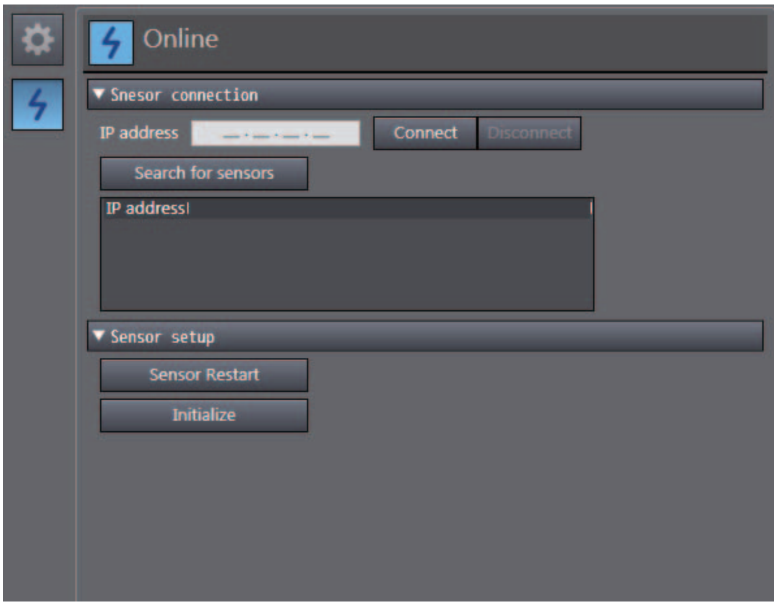
End the connection with a sensor currently connected with an online connection and switch to the offline state.

Additional Information

You can also check and edit settings data while the sensor is offline.

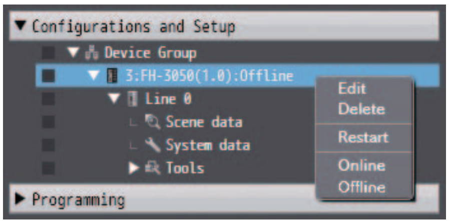
3-4-1 Ending a Connection in the Sensor Connection Screen

Open the sensor connection screen and then click the [Disconnect] button of [Online] - [Sensor connection].


Online
▼ Snesor connection
IP address
Connect
Disconnect
Search for sensors
IP address
▼ Sensor setup
Sensor Restart
Initialize

3-4-2 Ending a Connection in the Multiview Explorer

Right-click the type name in the Multiview Explorer and select [Offline] from the menu.


▼ Configurations and Setup
▼ Device Group
▼ 3:FH-3050(1.0):Offline
▼ Line 0
Scene data
System data
▶ Tools
▶ Programming
Edit
Delete
Restart
Online
Offline

3-5 Logging in to a Registered User's Account

If you have an account registered for an FH vision sensor, you will need to log in to the registered user account whenever you establish an online account with the relevant FH vision sensor. Log in using the user account for the UG0 group.

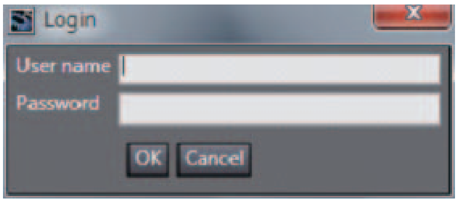
1 Establish an online connection with a vision sensor.

Establish an online connection with an FH vision sensor.

For details, refer to *3-2 Establishing an Online Connection with a Vision Sensor* on page 3-4.

2 Log in to your account.

If you have a user account registered for an FH vision sensor that is online, the below login screen will appear. Enter the user account for the registered account for the UG0 group and then select [OK].



Precautions for Correct Use

This function becomes available when the user name of the account for the FH vision sensor is changed from default settings.

The default [User name] and [Password] are both "Administrator."

4

Configuring Measurement Settings

On the FH vision sensor, processing items can be combined to configure measurement details. This section provides an overview of the processing units and describes how to edit a processing unit.

4-1 Overview of Processing Units 4-2
  4-1-1 Input Image 4-2
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  4-1-3 Compensate Image 4-2
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  4-2-4 Color 4-10
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4-1 Overview of Processing Units

This section provides an overview of the processing units that can be edited in the FH tools.

For details on each of the processing units, refer to *Vision System FH/FZ5 Series Processing Item Function Reference Manual* (Cat. No. Z341).

4-1-1 Input Image

This is a processing unit for loading images from a camera.

The main setting items are as follows.

Group	Item
Camera setting	Sets the camera shooting conditions.
Screen adjust	Sets the conditions related to the lighting and lens.
White balance	Sets the white balance in images loaded from the camera to correct its color and to make the white parts appear as white.
Calibration	Configures the settings for converting measurement results to the actual dimensions.
HDR setting	Sets the method for combining images in order to obtain it with a wide dynamic range.
Bright adjust setting	Sets how much the brightness of loaded images to be adjusted.

4-1-2 Measurement

This is a processing unit for inspection and measurement.

The main setting items are as follows.

Group	Item
Model	Allows you to register the parts you wish to inspect as models.
Region setting	Sets the range for searching a model and the range for calculating the amount of a certain feature.
Detection point	Sets which parts of a model you wish to detect as the coordinates during measurement.
Ref. setting	Changes the measurement values that will be the reference registered during model registration and region setting.
Measurement condition	Sets the condition for performing measurement.
Judgment condition	Sets the judgment condition for measurement values.
Output conditions	Sets the reflection condition for the coordinates or overall judgment output as measurement results.
Color	Sets the color information used for measurement.

4-1-3 Compensate Image

This is a processing unit for correcting images.

The main setting items are as follows.

Group	Item
Filter setting	Sets the filter conditions for image correction.
Region setting	Sets the region for performing correction.
Output image	Selects the image to output.

4-1-4 Support Measurement

This is a processing unit for providing support for calculation processing, data acquisition and browsing, and other processing.

The main setting items are as follows.

Group	Item
Setting[1]	Sets the condition for performing measurement.
Judgment condition	Sets the judgment condition for measurement values.
Output parameter	Sets the reflection condition for the coordinates or overall judgment output as measurement results.

[1] The item names differ for each processing unit.

Precautions for Correct Use

The decimal point symbol in the editing screen for Unit macros and Unit calculation macro processing items is fixed at "." (period), regardless of your computer's OS settings.

4-1-5 Branch

This is the processing unit for performing branching processing.

The main setting items are as follows.

Group	Item
Branch setting	Sets the condition for performing branching.
Setting	Sets the communication function and timeout function for performing flow control by communication.
Output conditions	Sets the reflection condition for the overall judgment.

4-1-6 Output Result

This is the processing unit for outputting measurement results to an external device.

The main setting items are as follows.

Group	Item
Setting	Sets the content to output.
Output format	Sets the format of the data to output.
Output conditions	Sets the reflection condition for the overall judgment.

4-1-7 Display Result

This is the processing unit for displaying any text, figure, or image on the screen displaying the measurement results.

The main setting items are as follows.

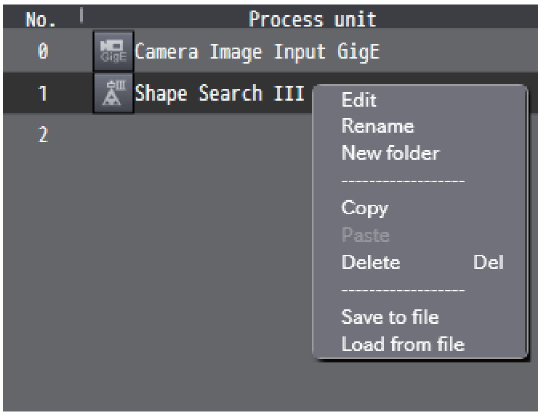
Group	Item
Setting[1]	Sets the content or condition to display.
Output conditions	Sets the reflection condition for the overall judgment.

[1] The item names differ for each processing unit.

4-2 Editing a Processing Unit

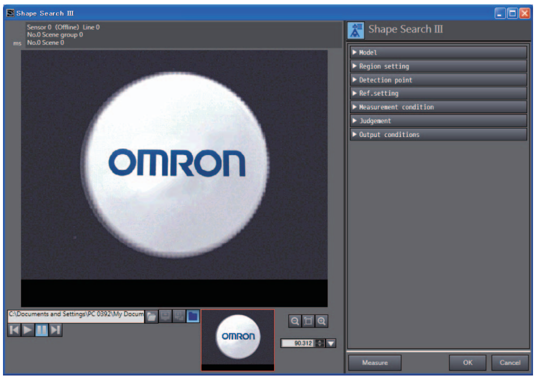
Right-click any processing unit in the flow list and then select [Edit] from the menu.

The editing screen of the selected processing unit appears.

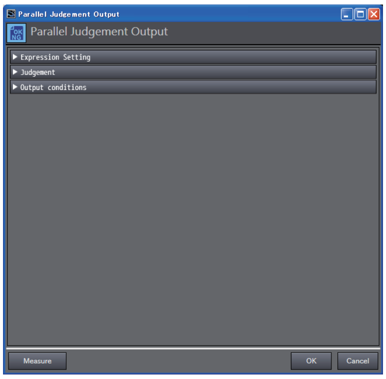

No.
Process unit
0
Camera Image Input GigE
1
Shape Search III
2
Edit
Rename
New folder
Copy
Paste
Delete Del
Save to file
Load from file

The editing screens of processing units are categorized into the following two types.

<Editing Screen with Image Display>


Shape Search III
Model
Region setting
Detection point
Ref.setting
Measurement condition
Judgement
Output conditions
Measure
OK
Cancel

<Editing Screen without Image Display>


Parallel Judgement Output
Expression Setting
Judgement
Output conditions
Measure
OK
Cancel

Each setting menu can be opened and closed on a group basis. In an editing screen with image display, an image or graphic information is displayed in accordance with the open menu.

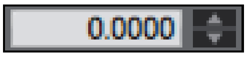
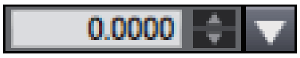
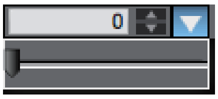
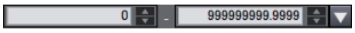
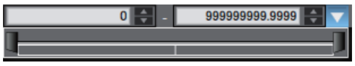
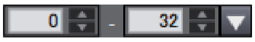
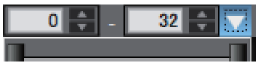
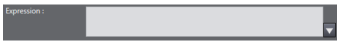
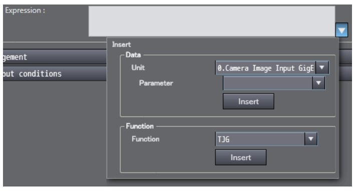
Clicking the [OK] button confirms the changes and closes the editing screen of the processing unit.

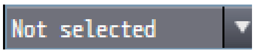
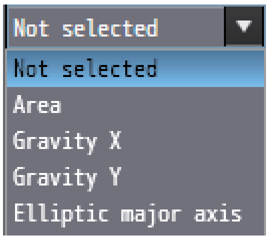
Clicking the [Cancel] button discards the changes and closes the editing screen of the processing unit.

The basic editing operations that can be performed with this tool are described below.

4-2-1 Parameter Settings

The following table lists the basic user interface components used for editing parameters.

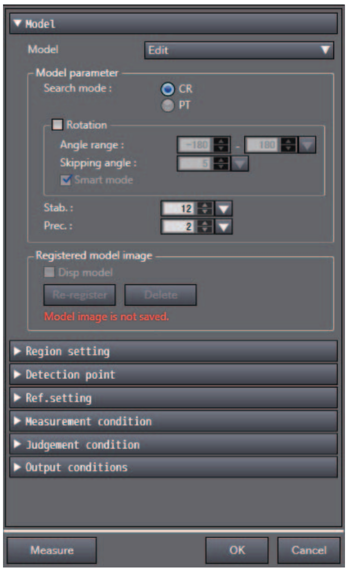
UI	Item	Description
	Numerical value input area	Allows you to enter numerical data. Entered data is treated as a double type value, but is displayed up to 4 digits after the decimal point.
Before clicking  After clicking 	Numerical value input area (With slider)	Allows you to enter numerical data. Entered data is treated as a double type value, but is displayed up to 4 digits after the decimal point. Clicking the button beside the numerical value input box displays a slider. Parameter values can be adjusted with the slider.
Before clicking  After clicking 	Numerical value upper limit and lower limit input area (With slider)	Allows you to enter numerical data for the upper and lower limits. Entered data is treated as a double type value, but is display is up to 4 digits after the decimal point. Clicking the button beside the numerical value input box displays a slider. Parameter values can be adjusted with the slider. It is not possible to set a lower limit value that is greater than the upper limit value.
Before clicking  After clicking 	Numerical value upper limit and lower limit input area (With slider) (With measurement value display)	This is the numerical value upper limit and lower limit input area with the addition of measurement value display. The bar at the place of the measurement value of the slider is green when the value is OK and red when it is NG.
Before clicking  After clicking  Expression : gement out conditions Insert Data Parameter Insert Function Insert Unit 0.Camera Image Input GigE Function TJG	Expression	Allows you to enter an expression. When input is complete, a validity check is performed for the expression. Clicking the button beside the text input box displays the calculation parameter input area. Any parameter can be inserted. Note When entering a calculation formula, the decimal point symbol is fixed at "." (period), regardless of your computer's OS settings.
	Text input area	Allows you to enter any text. The following characters cannot be entered. • ! • Tab
Unselected ○ Selected ●	Radio button	Selects one item from multiple selection items.
Unchecked ☐ Checked ☑	Check box	Enables or disable an item.

UI	Item	Description
Before clicking  Not selected After clicking  Not selected Not selected Area Gravity X Gravity Y Elliptic major axis	Combo box	Selects one item from multiple selection items.

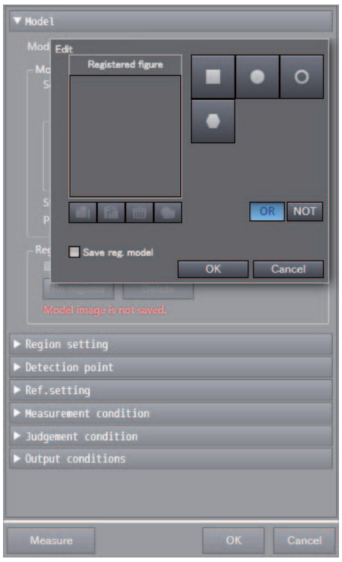
4-2-2 Editing an Area

You can edit a model area or measurement area.

Click the area editing button to display the area editing menu.

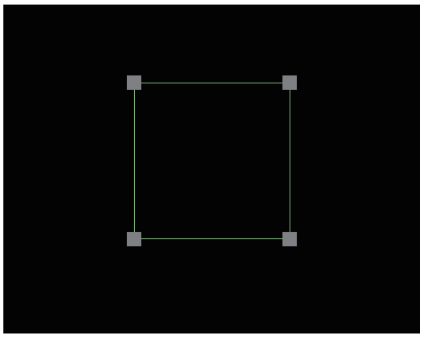

Model
Model
Edit
Model parameter
Search mode :
CR
PT
Rotation
Angle range :
Skipping angle :
Smart mode
Stab. :
Prec. :
Registered model image
Disp model
Re-register
Delete
Model image is not saved.
Region setting
Detection point
Ref.setting
Measurement condition
Judgement condition
Output conditions
Measure
OK
Cancel

→


Model
Edit
Registered figure
OR
NOT
Save reg. model
OK
Cancel
Model image is not saved.
Region setting
Detection point
Ref.setting
Measurement condition
Judgement condition
Output conditions
Measure
OK
Cancel

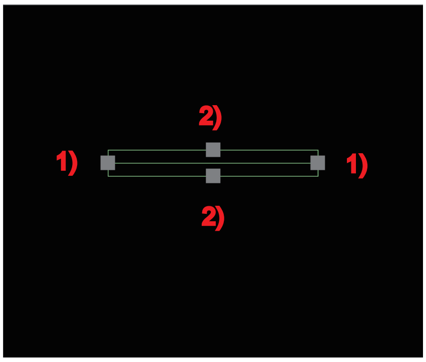
Six area editing functions are provided.

Rectangle



This function draws a rectangle. You can change the size of the rectangle by dragging the four corners. The rectangle can be moved by clicking and then dragging the inside of the rectangle.

Wide line

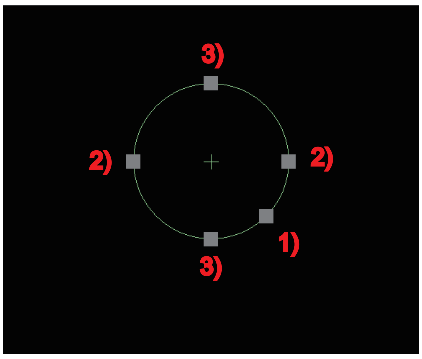


This function draws a wide line. You can change the size or direction by dragging the following vertices.

- Vertex (1)
  You can change the length or direction of the line by changing the start point or end point.
- Vertex (2)
  These allow you to change the width of the line.

The line can be moved by clicking and then dragging the inside of the area.

Ellipse

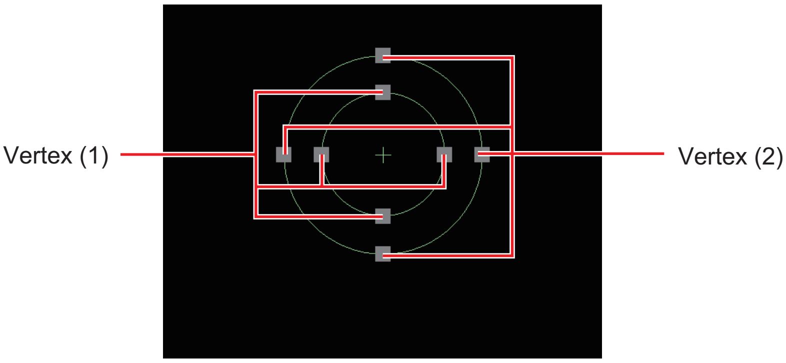


This function draws a circle or ellipse. You can change the size by dragging the following vertices.

- Vertex (1)
  These allow you to change the overall size while maintaining the XY ratio.
- Vertex (2)
  These allow you change the size in the X direction.
- Vertex (3)
  These allow you change the size in the Y direction.

The eclipse can be moved by clicking and then dragging the inside of the area.

Circumference

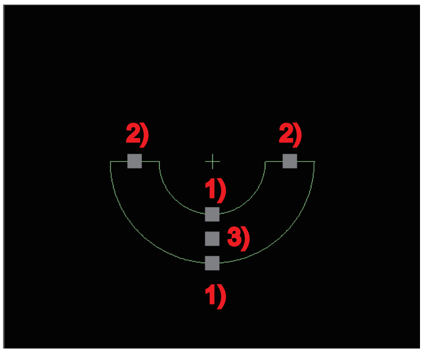


This function draws a circumference. You can change the size by dragging the following vertices.

- Vertex (1)
  These change the radius of the inner circle.
- Vertex (2)
  These change the size of the circle while maintaining the difference in the diameters of the inner and outer circles.

The circumference can be moved by clicking and then dragging the inside of the area.

Wide arc



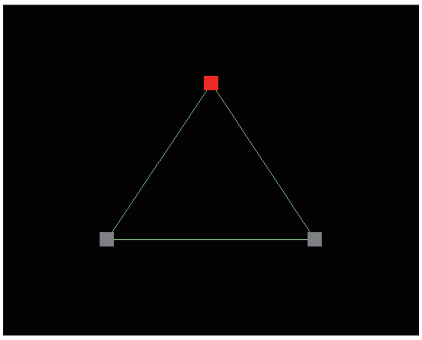
This function draws a wide arc. You can change the start point, end point, width, and position by dragging the following vertices.

- Vertex (1)
  These allow you to change the width.
- Vertex (2)
  These allow you to change the start point, end point, and radius.
- Vertex (3)
  This allows you to move the center position while keeping the start point and end point positions fixed.

The arc can be moved by clicking and then dragging the inside of the area.

4-2 Editing a Processing Unit
4
4-2-3 Color Extraction

Polygon



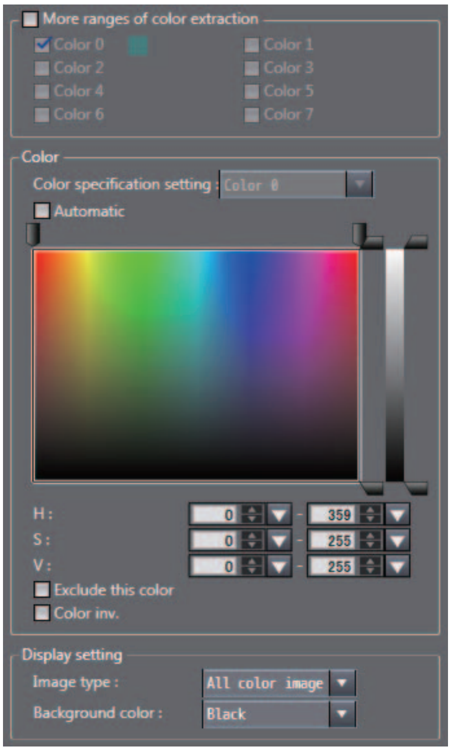
This function draws a polygon. Up to 10 vertices can be added.

Clicking any position on a side creates a new vertex.

You can change the position of a vertex by dragging it.

The polygon can be moved by clicking and then dragging the inside of the area.

4-2-3 Color Extraction



☐ More ranges of color extraction
☑ Color 0
☐ Color 1
☐ Color 2
☐ Color 3
☐ Color 4
☐ Color 5
☐ Color 6
☐ Color 7

Color
Color specification setting : Color 0
☐ Automatic
H : 0 - 359
S : 0 - 255
V : 0 - 255
☐ Exclude this color
☐ Color inv.

Display setting
Image type : All color image
Background color : Black

You can specify up to eight colors.

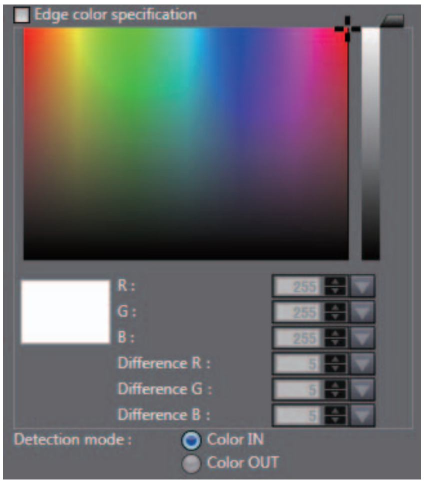
Also, when the Automatic check box is selected, enclosing any part in a displayed image automatically extracts the color of that part.

The color range can be specified by specifying the hue, saturation, and brightness.

The specifications are the same as for the user interface of the FH vision sensor.

For details, refer to *Vision System FH/FZ5 Series Processing Item Function Reference Manual* (Cat. No. Z341).

4-2-4 Color



☐ Edge color specification
R : 255
G : 255
B : 255
Difference R : 5
Difference G : 5
Difference B : 5
Detection mode : ● Color IN ○ Color OUT

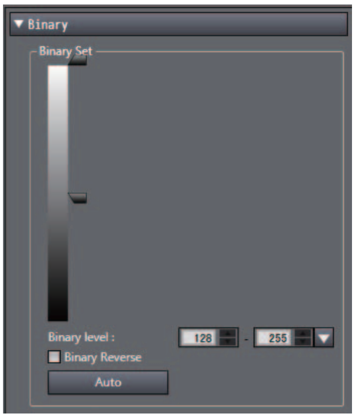
You can specify any color.

The color can be specified by specifying the hue, saturation, and brightness.

The specifications are the same as for the user interface of the FH vision sensor.

For details, refer to *Vision System FH/FZ5 Series Processing Item Function Reference Manual* (Cat. No. Z341).

4-2-5 Binary

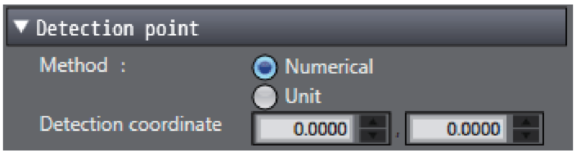


Binary level : 128 - 255
☐ Binary Reverse

You can specify the range of binarization levels.

If you select the [Binary Reverse] check box, binarization is performed for outside of the range between the upper and lower limits.

4-2-6 Detection Point/Reference Point



▼ Detection point

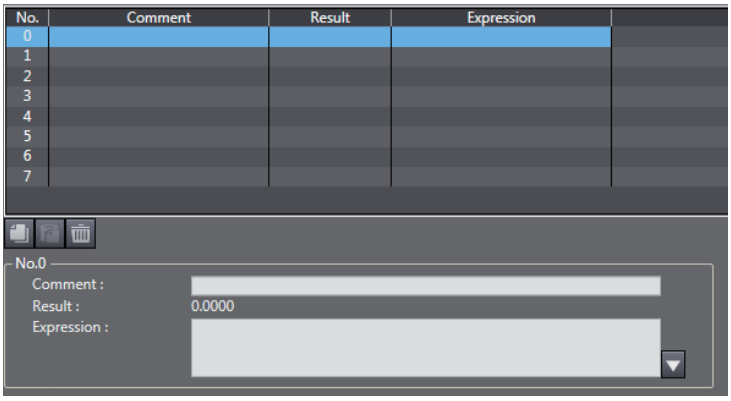
Method : ● Numerical ○ Unit

Detection coordinate 0.0000 , 0.0000

The detection point and reference point can be set with the numerical value input boxes.

Clicking any place in the displayed image reflects that coordinate value as the setting value.

4-2-7 List



No.	Comment	Result	Expression
0			
1			
2			
3			
4			
5			
6			
7			

No.0

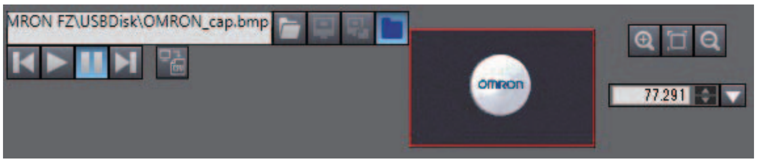
Comment :

Result : 0.0000

Expression :

Selecting an item in the list displays the information for the selected item below the list. Each of the information items displayed below the list can be edited.

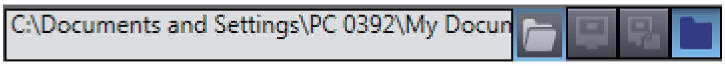
4-2-8 Image Control Area



MRON FZ\USBDisk\OMRON_cap.bmp

77.291

File selection section



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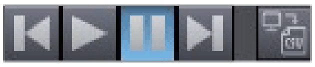
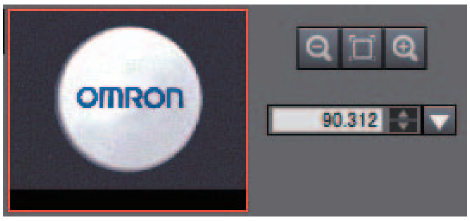
This allows you to select the image to display. Refer to *File selection section* on page 2-18.

Image control section



This allows you to control the measurement of the image. Refer to *Image control section* on page 2-19.

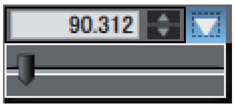
Image size control section



This allows you to enlarge or reduce the displayed image.

The place where the image is displayed in the left zoom area is enclosed in a rectangle.

You can move the display place by moving this rectangle.

Button	Description
⊕	Enlarges the image. Doubles the size of displayed image. (Upper limit: 1600%)
⊖	Reduces the image. Halves the size of displayed Image. (Lower limit: 1%)
▢	Makes the image to fit the display frame.
 90.312	The zoom ratio can be specified by directly entering a numerical value or by moving the slider.

5

Designing Exchange with External Devices

This section describes how to establish a connection with an external device.

5-1 Setting Procedure 5-3

The FH vision sensor has the following interfaces.

- Parallel I/O
- RS-232C/422
- Ethernet
- EtherCAT

Each interface supports various communication protocols.

You can configure their communication settings in the system settings of the FH tools.

Configure the communication settings for each line when in the multiple multi-line random-trigger modes. However, some data is settings data that is common to the lines.

Group	Item	Attribute
Parallel I/O		Common to lines
		—
RS-232C/422		Common to lines
		—
Ethernet	Address settings	Common to lines
	Input/output settings	Individual to each line
EtherNet/IP		Individual to each line * Some parameters are common to lines
EtherCAT		Individual to each line

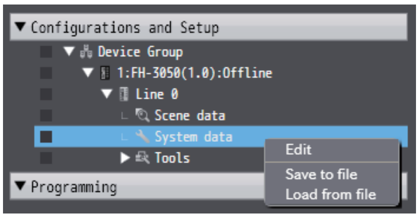
If the communication settings are changed, the FH vision sensor needs to be restarted.

If a parameter that requires a restart is edited, "❗" is displayed for the sensor type in the Multiview Explorer. If "❗" is displayed, save the settings and then restart the FH vision sensor.

For details on restarting, refer to *2-4-4 Multiview Explorer* on page 2-10.

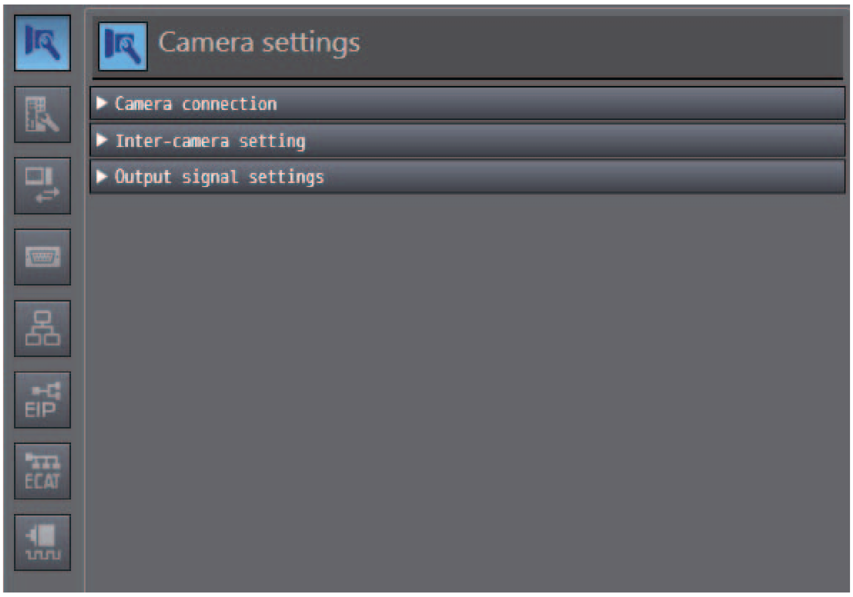
5-1 Setting Procedure

You can open the system settings screen by double-clicking [System data] in the Multiview Explorer or by right-clicking it and selecting [Edit] from the menu.


Configurations and Setup
Device Group
1:FH-3050(1.0):Offline
Line 0
Scene data
System data
Tools
Programming
Edit
Save to file
Load from file

In the system settings screen, you can click any of the following buttons to configure the corresponding settings.

For details on the settings, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).


Camera settings
Camera connection
Inter-camera setting
Output signal settings
EIP
ECAT

Button	Setting Item	Description
⇄	Parallel I/O	Sets the Parallel I/O settings.
▭	RS-232C/422	Sets the RS-232C/422 settings.
品	Ethernet	Sets the settings related to Ethernet.
EIP	EtherNet/IP	Sets the settings related to EtherNet/IP.
ECAT	EtherCAT	Sets the settings related to EtherCAT.

Precautions for Correct Use

- A restart is required after configuring the Ethernet, EtherNet/IP, and EtherCAT settings.
- When multi-line random-trigger mode is selected, the communication settings needs to be configured for each line.

  However, the RS-232C/422 settings are common between the lines.

  For the other communication settings, individually configure the settings in the system settings for each line.

6

Online Debugging

This section describes how to perform online debugging of the FH sensor controller.

6-1 Performing Test Measurement 6-2
- 6-1-1 Measuring Camera Images 6-2
- 6-1-2 Measuring File Images in the RAMDisk or USB Memory of the Vision Sensor 6-3
- 6-1-3 Measuring Logging Images in the Vision Sensor Memory 6-3

6-2 Checking Measurement Results 6-4
- 6-2-1 Checking Detailed Results 6-4
- 6-2-2 Changing the Image Display Settings 6-6
- 6-2-3 Checking Multiple Measurement Images at the Same Time 6-6

6-3 Checking Result Output 6-7

6-4 Saving Measurement Results 6-8

6-5 Saving Settings Data 6-9

6-1 Performing Test Measurement

You can perform test measurement with the FH tools.

Select from the following three test measurement target images when connected with an online connection.

Target Image	Measurement Type	Description
Camera image	Single measurement	Measures a camera image.
	Continuous measurement	Continuously measures camera images.
File image	Single measurement	Allows you to select and measure a file image in the RAMDisk or USB memory of the FH vision sensor.
	Continuous measurement	Continuously measures file images in the RAMDisk or USB memory of the FH vision sensor. Measurement ends when measurement of the images within the same folder finishes.
Logging image	Single measurement	Allows you to select and measure a logging image in the FH vision sensor memory.
	Continuous measurement	Continuously measures logging images in the FH vision sensor memory. Measurement ends when measurement of all logging images finishes.

6-1-1 Measuring Camera Images

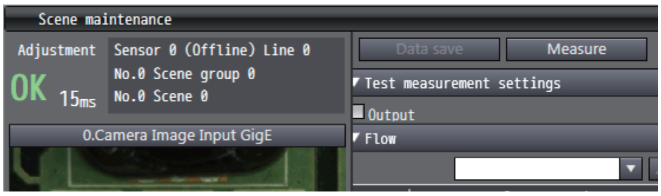
To select a camera image, first click the camera image button (🖥) in the file selection section.

Then select a camera image and click the [Measure] button.

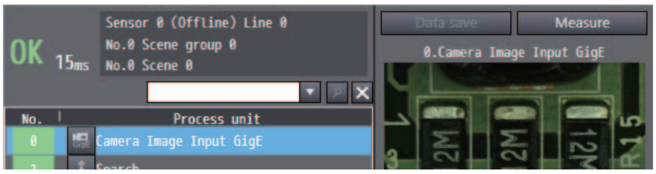
[Measure] is provided in the following editing screens.

- Scene maintenance window
- Scene editing screen
- Processing unit editing screen

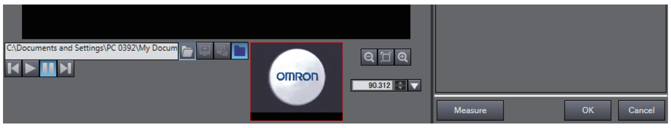
<Scene maintenance window>


Scene maintenance
Adjustment
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0
OK
15ms
0.Camera Image Input GigE
Data save
Measure
Test measurement settings
Output
Flow

<Scene editing screen>


OK
15ms
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0
Data save
Measure
0.Camera Image Input GigE
No.
Process unit
0
Camera Image Input GigE
Search

<Processing unit editing screen>



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To start continuous measurement, click the continuous measurement button (▶).

If you wish to stop continuous measurement, click the continuous measurement stop button (⏸).

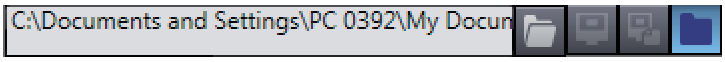
The settings data cannot be edited during continuous measurement.

6-1-2 Measuring File Images in the RAMDisk or USB Memory of the Vision Sensor

Select the measurement target file and click the [Measure] button.

Select the file as described below.

1. Click the [File] button.



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2. Click the file selection button (📁) and then select the target file.
3. Click the [Measure] button.

To start continuous measurement, click the continuous measurement button (▶).

If you wish to stop continuous measurement, click the continuous measurement stop button (⏸).

The settings data cannot be edited during continuous measurement.

6-1-3 Measuring Logging Images in the Vision Sensor Memory

Select the measurement target logging image and click the [Measure] button.

Select the file as described below.

1. Click the [Logging image] button.
2. Click the [Measure] button.

If you wish to change the measurement target logging image, click the button for measuring the previous image (⏮) or click the button for measuring the next image (⏭).

To start continuous measurement, click the continuous measurement button (▶).

If you wish to stop continuous measurement, click the continuous measurement stop button (⏸).

The settings data cannot be edited during continuous measurement.

6-2 Checking Measurement Results

You can check the measurement results in each editing screen.

On the displayed image, the measurement results of the selected processing unit are displayed as a graphic.

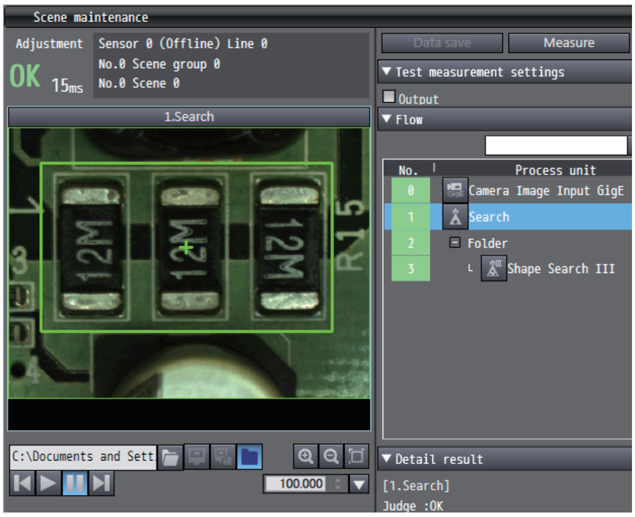
6-2-1 Checking Detailed Results

Scene maintenance window, monitor window, and scene data editing screen

Open the [Flow] item and [Detail result] item and click the [Measure] button.

If you select any of the processing units in the list of the [Flow] item, the measurement result of each item that is a judgment result of that processing unit will be displayed in the [Detail result] item.

<Scene maintenance screen>


Scene maintenance
Adjustment
OK
15ms
1.Search
Data save
Measure
Test measurement settings
Output
Flow
Detail result

Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0

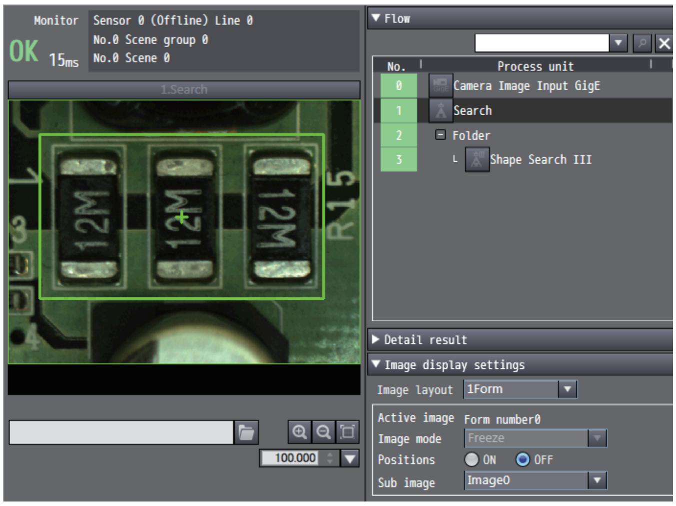
No.	Process unit
0	Camera Image Input GigE
1	Search
2	Folder
3	Shape Search III

C:\Documents and Sett

100.000

[1.Search]
Judge :OK

<Monitor window>


Monitor
OK
15ms
1.Search
Flow
Detail result
Image display settings

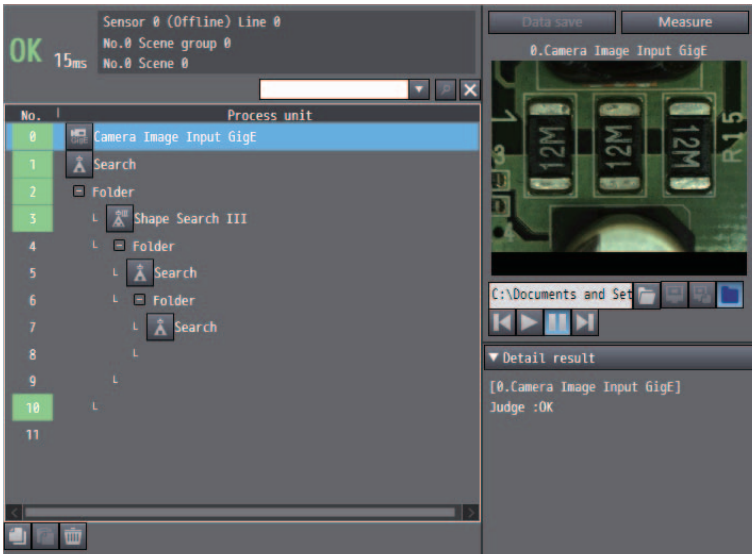
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0

No.	Process unit
0	Camera Image Input GigE
1	Search
2	Folder
3	Shape Search III

100.000

Image layout 1Form
Active image Form number0
Image mode Freeze
Positions ○ ON ● OFF
Sub image Image0

<Scene data editing screen>



OK 15ms

Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0

No.	Process unit
0	Camera Image Input GigE
1	Search
2	Folder
3	Shape Search III
4	Folder
5	Search
6	Folder
7	Search
8	
9	
10	
11	

0.Camera Image Input GigE

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Detail result

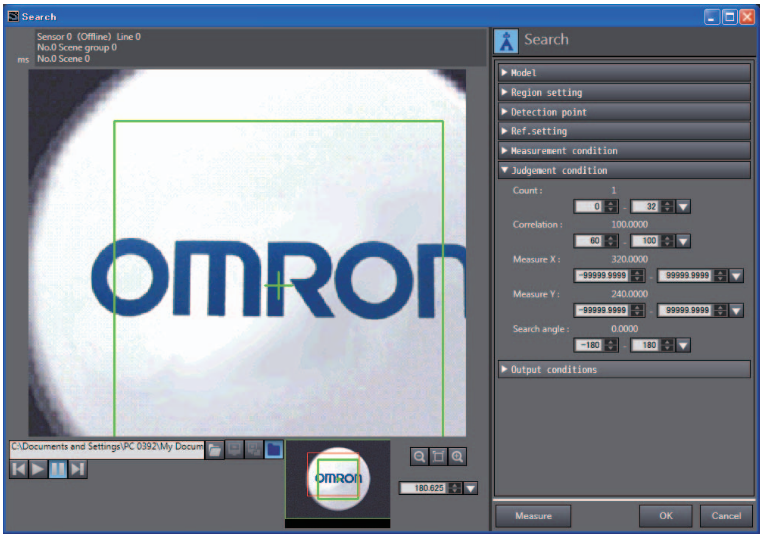
[0.Camera Image Input GigE]
Judge :OK

Data save
Measure
12M
12M
12M

Processing unit editing screen

Open the [Judgment condition] item and click the [Measure] button.

The measurement result of each item that is a judgment result of the processing unit is displayed



Search

Sensor 0 (Offline) Line 0
No.0 Scene group 0
ms No.0 Scene 0

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180.625

Search

Judgement condition

Count : 1
0 - 32

Correlation : 100.0000
60 - 100

Measure X : 320.0000
-99999.9999 - 99999.9999

Measure Y : 240.0000
-99999.9999 - 99999.9999

Search angle : 0.0000
-180 - 180

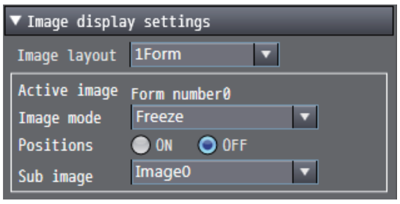
OMRON
Model
Region setting
Detection point
Ref.setting
Measurement condition
Output conditions
Measure
OK
Cancel

6-2-2 Changing the Image Display Settings

You can change the setting for displaying images in the scene maintenance window and monitor window.

Open the [Image display settings] item and change each items.

For details on the image display settings, refer to *Image display settings* on page 2-17.



▼ Image display settings

Image layout: 1Form

Active image: Form number0

Image mode: Freeze

Positions: ○ ON ● OFF

Sub image: Image0

Item	Description
Image layout	Selects the number of images to display. Selection items: 1Form, 2Form, and 4Form
Image mode	Selects the image mode for the image with the focus on it. Selection items: Through, Freeze, and NG image
Positions	Selects position list display for the image with the focus on it. Selection items: OFF and ON
Sub image	Selects the sub image number for the image with the focus on it. Selection items: Image0, Image1,..., image31

You can switch the result display content of the processing unit by changing the sub image number.

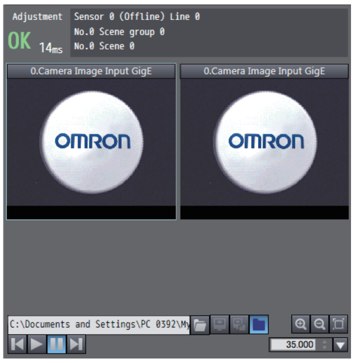
For details, refer to the content of each processing unit in *Vision System FH/FZ5 Series Processing Item Function Reference Manual* (Cat. No. Z341).

6-2-3 Checking Multiple Measurement Images at the Same Time

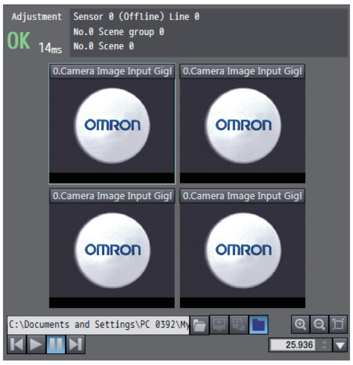
You can display multiple images by opening the [Image display settings] item and changing [Image layout].

For details on the image display settings, refer to *Image display settings* on page 2-17.

<2Form display>


Adjustment
OK
14ms
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0
0.Camera Image Input GigE
0.Camera Image Input GigE
OMRON
OMRON
C:\Documents and Settings\PC 0392\My
35.000

<4Form display>


Adjustment
OK
14ms
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0
0.Camera Image Input GigE
0.Camera Image Input GigE
0.Camera Image Input GigE
0.Camera Image Input GigE
OMRON
OMRON
OMRON
OMRON
C:\Documents and Settings\PC 0392\My
25.936

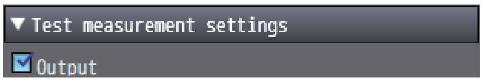
6-3 Checking Result Output

Normally, output to an external device is performed when the monitor window is open, but it is not performed while scene data is being edited in the following editing screens.

- Scene maintenance window
- Scene data editing screen
- Processing unit editing screen
- Editing screen of each tool

If you wish to output the measurement results in those screens, select the following check box in the adjustment screen.

- [Test measurement settings] - [Output]



6-4 Saving Measurement Results

If you wish to save measurement results or images, use the logging related processing units.

- Image logging
- Image conversion logging
- Data logging

These processing units can be used to output images and measurement results to the RAMDisk/USB memory of the FH vision sensor or the FH vision sensor memory.

For details on the processing units, refer to *Vision System FH/FZ5 Series Processing Item Function Reference Manual* (Cat. No. Z341).

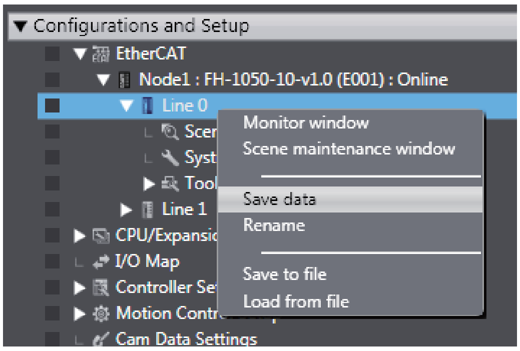
To acquire the files output to the RAMDisk or USB memory of the FH vision sensor, use the file management tool

For details, refer to *8-3 Using the File Save Tool* on page 8-4.

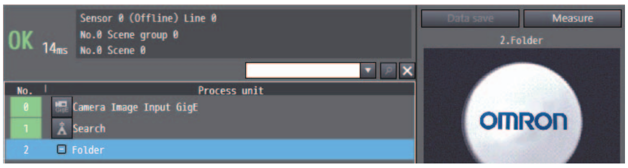
6-5 Saving Settings Data

After adjusting the settings data, you need to save the settings data to the flash memory of the FH vision sensor. There are the following two ways to save the settings data.

(1) Right-click [Configuration and Setup] - [Device Group] - [FH-XXXX] - [Line X] in the Multiview Explorer and then click [Save data].


Configurations and Setup
EtherCAT
Node1 : FH-1050-10-v1.0 (E001) : Online
Line 0
Scen
Syst
Tool
Line 1
CPU/Expansio
I/O Map
Controller Se
Motion Contr
Cam Data Settings
Monitor window
Scene maintenance window
Save data
Rename
Save to file
Load from file

(2) Click the [Data save] button in the scene maintenance window.


OK
14ms
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0
Data save
Measure
2.Folder
No.
Process unit
0
Camera Image Input GigE
1
Search
2
Folder
OMRON

The settings data can also be saved and managed as files.

- Scene data basis (Refer to *2-5-2 Managing Scenes* on page 2-26)
- Scene group basis (Refer to *2-5-6 Managing Scene Groups* on page 2-28)
- Processing unit basis (Refer to *2-6-2 Managing Processing Units* on page 2-32)

7

Offline Debugging

This section describes offline debugging techniques for the FH sensor controller.

7-1 Performing Offline Simulation of Sensor Measurement Operation 7-2

7-2 Offline Debugging of the Sensor Control Program and Sensor Operation (Only When EtherCAT Connection) 7-3

7-2-1 Control Signals Supported with Offline Debugging 7-4

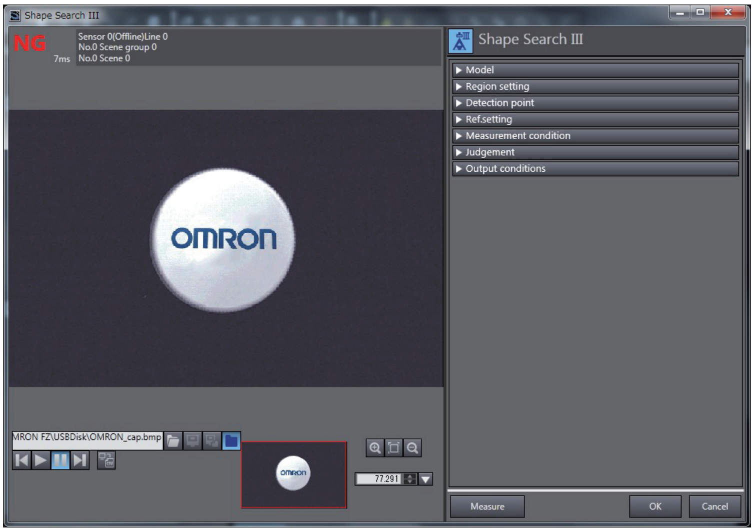
7-2-2 Offline Debugging Procedure for the Sensor Control Program 7-4

7-1 Performing Offline Simulation of Sensor Measurement Operation

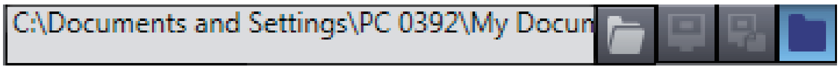
Even when offline, simulation of the measurement operation can be performed using file images on the computer.
Selection and measurement of file image can be performed in the following editing screens.

- Scene maintenance window
- Scene editing screen
- Processing unit editing screen

Select the file as described below.


Shape Search III
NG
7ms
Sensor 0(Offline)Line 0
No.0 Scene group 0
No.0 Scene 0
Shape Search III
Model
Region setting
Detection point
Ref.setting
Measurement condition
Judgement
Output conditions
MRON FZ\USBDisk\OMRON_cap.bmp
77.291
Measure
OK
Cancel

1 Click the [File] button.


C:\Documents and Settings\PC 0392\My Docun

2 Click the file selection button (📁) and then select the target file.

3 Click the [Measure] button.

If you click the continuous measurement button (▶), continuous measurement of the images in the same folder is performed. Measurement ends when measurement of all the files finishes.
If you wish to stop continuous measurement part way through the process, click the continuous measurement stop button (⏸).

The [Measure] button is provided in the monitor window, scene maintenance window, and processing unit editing screen.
For details, refer to *6-1-1 Measuring Camera Images* on page 6-2.

Additional Information

The images measured with the sensor can be saved as logging image files.
Refer to *8-3-3 Saving a Logging Image as a File* on page 8-6.

7-2 Offline Debugging of the Sensor Control Program and Sensor Operation (Only When EtherCAT Connection)

In a system built with EtherCAT, you can perform simulation with the sequence control of NJ series controller and operation of FH image sensor linked.

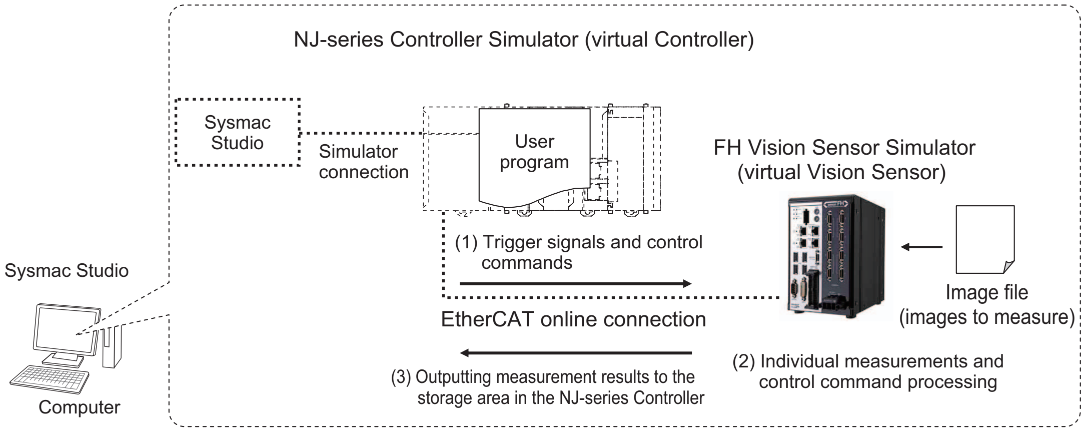
Therefore, offline debugging for operation up until the output of the result is possible for measurement or various other processing performed when a measurement trigger or other control signal is input to the FH image sensor.

This simulation function is available only in Sysmac Studio (standard edition).

Additional Information

This simulation is supported from the following versions:

- Sysmac Studio (Standard Edition) Ver. 1.08
- FH Software Ver. 5.1*


NJ-series Controller Simulator (virtual Controller)
Sysmac Studio
Simulator connection
User program
FH Vision Sensor Simulator (virtual Vision Sensor)
Sysmac Studio
(1) Trigger signals and control commands
Image file (images to measure)
EtherCAT online connection
Computer
(3) Outputting measurement results to the storage area in the NJ-series Controller
(2) Individual measurements and control command processing

Operations That Are Possible with Simulation

7-2-1 Control Signals Supported with Offline Debugging

The following table shows the operation of each item that is PDO mapped in offline debugging.

Logic simulation is possible for this offline debugging. The ON/OFF times of each signal is not the same as the actual processing times.

Item			Signal Input and Output Timing
Command area	Trigger	Triggers measurement	—
	Command Request	Executes a command	—
	Flow Command Request	Executes a flow command	—
	Result Set Request	Data output request	—
	Error Clear	Clears an error	—
Response area	Command Completion	Command completed	Turns ON when BUSY signal turns OFF.
	BUSY	Processing in progress	The BUSY ON time is fixed at 10 [PDO cycles].
	Trigger Ready	Trigger input ready state	OFF while BUSY is ON.
	Total Judgement	Outputs total judgment	Outputs when BUSY turns OFF.
	Run Mode	Run mode	Turns ON when monitor window is open.
	Trigger Ack	Trigger acknowledged state	Turns ON one [PDO cycle] after trigger input.
	Command Ready	Ready for command	OFF while BUSY is ON.
	Shutter Output	Outputs shutter trigger	Turns ON for one [PDO cycle] only after trigger input.
	Flow Command Completion	Flow command completed	Turns ON when Flow Command Busy turns OFF.
	Flow Command Busy	Executing flow command	ON time of Flow Command Busy is fixed at one [PDO cycle].
	Flow Command Wait	Ready for flow command	When flow control processing unit is used, turns ON one [PDO cycle] after BUSY turns ON.
	Error Status	Error signal	Turns ON when an error occurs.
	Result Notification	Data output completed	*1
Data area	DINT ResultData 0 to 63	DINT result data	*1
	LREAL ResultData 0 to 31	LREAL result data	*1

*1. The output timing depends on the operating environment of the computer.

7-2-2 Offline Debugging Procedure for the Sensor Control Program

You can perform simulation with sequence control and image sensor operation linked to perform offline debugging. The procedure is as follows.

1. Add an image sensor to the EtherCAT slave configuration.
2. Configure the image sensor settings.

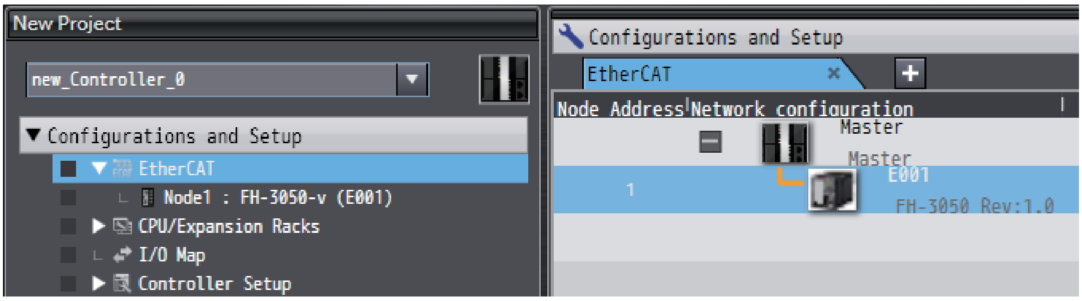
   Refer to *Section 4 Configuring Measurement Settings*.
3. Input a measurement trigger using a control flag and check the result.

The following describes the procedure from adding an image sensor to the EtherCAT slave configuration to checking the result under the assumption that a sequence program has been prepared.

1 Add the [FH-XXXX] vision sensor to the EtherCAT slave configuration using either of the methods below.

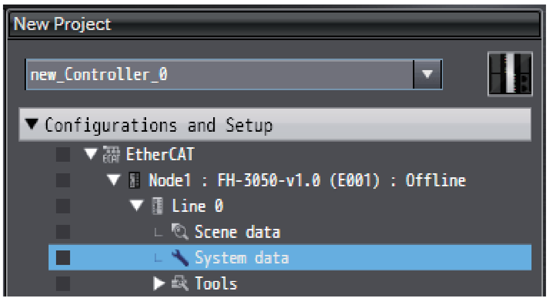
- Drag [FH-XXXX] from the [Tool box] and drop it on to the network configuration editing window.
- When the master is selected in the network configuration editing window, double-click [FH-XXXX] displayed in the [Tool box].

For details on how to register to the EtherCAT slave, refer to *5-1 EtherCAT Configuration and Settings* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).


New Project
new_Controller_0
Configurations and Setup
EtherCAT
Node1 : FH-3050-v (E001)
CPU/Expansion Racks
I/O Map
Controller Setup
Configurations and Setup
EtherCAT
Node Address Network configuration
Master
Master
1
E001
FH-3050 Rev:1.0

2 Configure the vision sensor settings.

Double-click [NodeX: FH-XXXX]-[Line X]-[Scene data]/[System data] in the Multiview Explorer.


New Project
new_Controller_0
Configurations and Setup
EtherCAT
Node1 : FH-3050-v1.0 (E001) : Offline
Line 0
Scene data
System data
Tools

The corresponding data settings screen appears in the Edit Pane. Configure the various settings.

3 Create device variables.

Create device variables to access the FH.

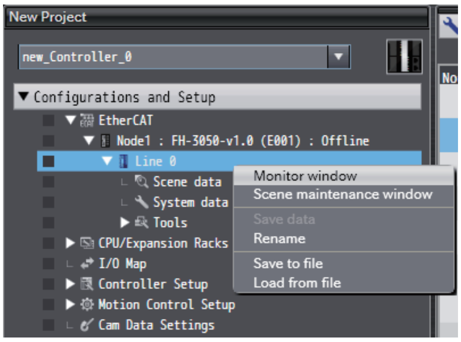
For details on how to create device variables, refer to *4-1-2 Creating Device Variables* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

4 Create and build a program to operate the device.

For details on how to create a program, refer to *4-5 Programming* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

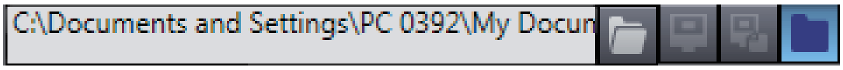
5 Open the scene monitor window.

Right-click [FH-XXXX] - [Line X] in the network configuration editing pane and then select [Monitor window].


New Project
new_Controller_0
Configurations and Setup
EtherCAT
Node1 : FH-3050-v1.0 (E001) : Offline
Line 0
Scene data
System data
Tools
CPU/Expansion Racks
I/O Map
Controller Setup
Motion Control Setup
Cam Data Settings
Monitor window
Scene maintenance window
Save data
Rename
Save to file
Load from file

6 Specify the measurement image.

Click the image file selection button and then select an image.


C:\Documents and Settings\PC 0392\My Docum

Additional Information

There are no image files immediately after installation of the FH tool. Acquire logged files or image files saved in the FH unit.

To acquire images, refer to *Saving Logged Images in the Controller Memory (RAM) to a RAM Disk or an External Memory Device* in *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

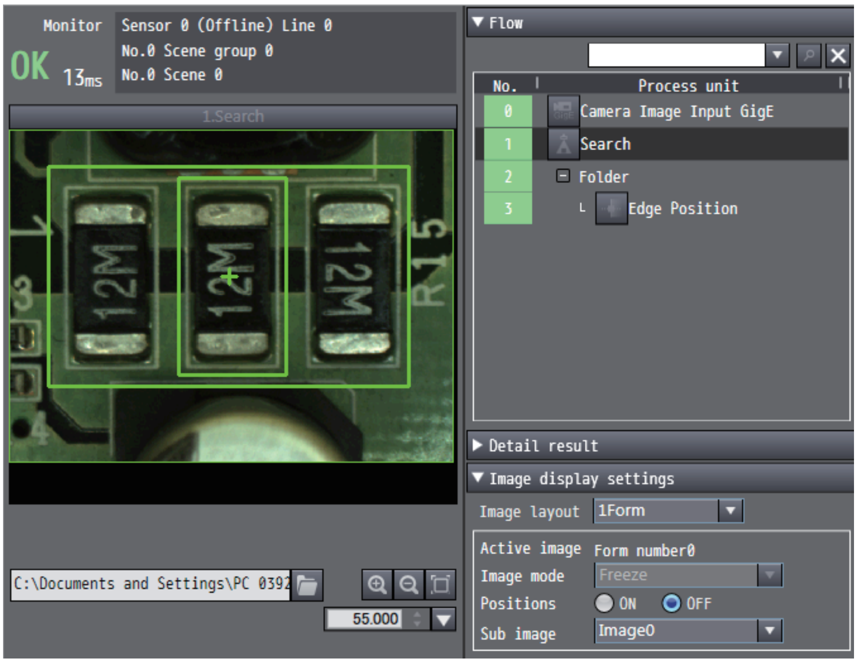
7 Select [Simulation] - [RUN].

The simulator starts.

When the simulator connection is complete, the simulator of the NJ series controller and FH vision sensor internally establish an online connection with EtherCAT and the NJ series controller enters the operating state.

For details on how to operate the simulator, refer to *7-3-1 Debugging with Program Simulation* in *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504-E1-08 or later).

8 If you operate the control flag from sequence control and execute measurement, you will be able to check the measurement results in the following monitor window.


Monitor
OK 13ms
Sensor 0 (Offline) Line 0
No.0 Scene group 0
No.0 Scene 0
1.Search
C:\Documents and Settings\PC 0392
55.000
▼ Flow
No.
Process unit
0 Camera Image Input GigE
1 Search
2 Folder
3 Edge Position
▶ Detail result
▼ Image display settings
Image layout 1Form
Active image Form number0
Image mode Freeze
Positions ○ ON ● OFF
Sub image Image0

Additional Information

If the run mode (Status Flag: Run Mode) of the response area is OFF when simulation is executed, open the Monitor window.

When the Monitor window is opened, the run mode changes to ON.

Precautions for Correct Use

Simulations of sensor control programs can only be executed for a single FH vision sensor at a time while the sensor settings are being edited offline. You cannot run simulations for multiple FH vision sensors at the same time.

The vision sensor currently being edited offline will have <Editing..> added to the end of the [Type] in the Multiview Explorer.

8

Other Useful Functions

This section provides a list of useful tools that can be used in the configuration and operation of the FH series vision sensors.

8-1 Using the Command Customize Setting Tool 8-2

8-2 Using the Calibration Support Tool 8-3

8-3 Using the File Save Tool 8-4

8-3-1 Opening the File Save Tool 8-4
8-3-2 Copying a File 8-4
8-3-3 Saving a Logging Image as a File 8-6

8-4 Using the User Data Setting Tool 8-7

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8-12 Using the Conversion Scene Group Data Tool 8-18

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8-14 Print the Settings 8-20

8-1 Using the Command Customize Setting Tool

This tools allows you to edit custom commands.

It is the same as the [Tools] - [Communication Command Customize] function provided with the FH vision sensor.

For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

Precautions for Correct Use

The decimal point symbol is fixed at "." (period), regardless of your computer's OS settings.

8-2 Using the Calibration Support Tool

A calibration support tool is available.

It is the same as the [Tools] - [Calibration Support Tool] function provided with the FH vision sensor.

For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

8-3 Using the File Save Tool

The file save tool allows you to copy and transfer files in the external memory of the FH vision sensor. It also allows you to output logging image files in the FH vision sensor memory.

8-3-1 Opening the File Save Tool

To open the File Save Tool, select [Tools] - [Save file] in the Multiview Explorer and then either double-click [Save file] to pull up the Save screen or right-click and select [Edit] from the pop-up menu that appears.

The file management tool screen appears in the Edit pane.

8-3-2 Copying a File

You can copy a file in the external memory of the FH vision sensor and then save it under a different name or transfer it to the computer.

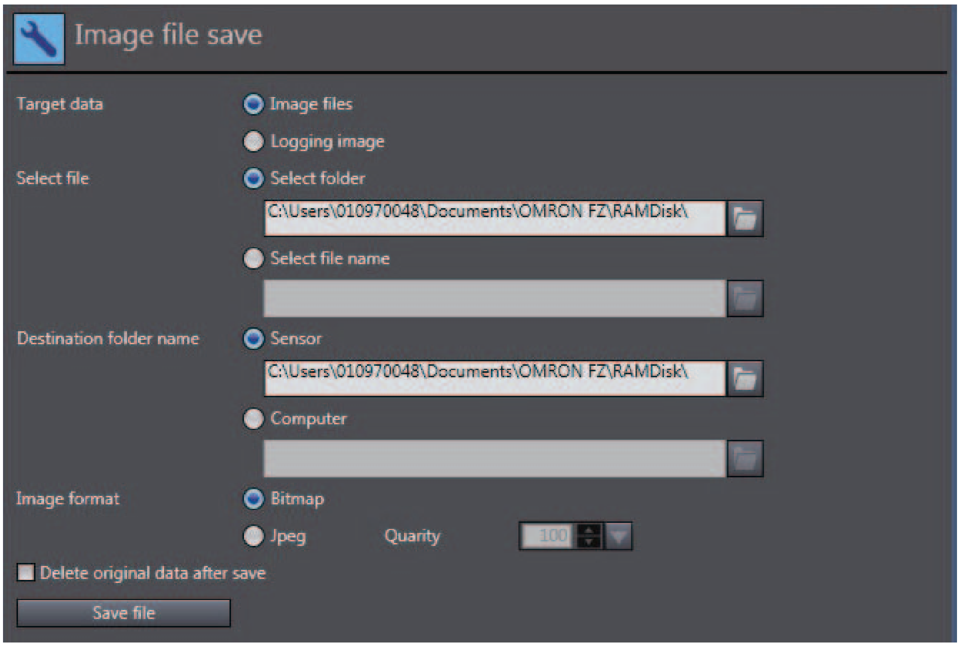


Image file save

Target data: ● Image files ○ Logging image

Select file: ● Select folder

C:\Users\010970048\Documents\OMRON FZ\RAMDisk\

○ Select file name

Destination folder name: ● Sensor

C:\Users\010970048\Documents\OMRON FZ\RAMDisk\

○ Computer

Image format: ● Bitmap ○ Jpeg Quarity 100

☐ Delete original data after save

1 Select [File] for [Target data].

2 Select a file.

You can select data on a folder basis or on a file basis.

If you select an individual folder, you can narrow down the files by type.

The following file types can be selected to narrow down the data.

- All files
- Logging images (*.ifz, *.byr)
- Bitmap (*.bmp)
- CSV (*.csv)
- Scene data (*.scn)
- Scene group data (*.sgp)
- System data (*.ini)
- System settings + Scene group 0 data (*.bkd)
- Operation log (*.log)

3 Select the save destination folder.

To save the file by copying it to the external memory of the FH vision sensor, select [Sensor].

To save the file to the computer, select [Computer].

If you wish to delete the original file after saving, select the [Delete original data after save] check box.

4 Save the file.

Click the [Save file] button to save the file.

The selected file is copied to the specified folder.

8-3-3 Saving a Logging Image as a File

You can save a logging image in the FH vision sensor memory as a file.

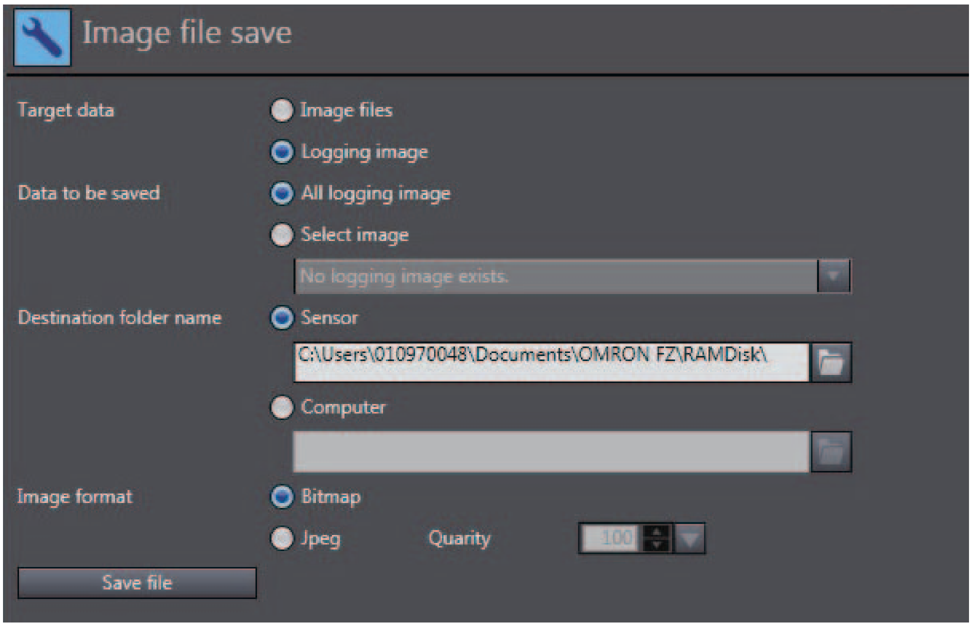


Image file save

Target data: ○ Image files ● Logging image

Data to be saved: ● All logging image ○ Select image (No logging image exists.)

Destination folder name: ● Sensor (C:\Users\010970048\Documents\OMRON FZ\RAMDisk\) ○ Computer

Image format: ● Bitmap ○ Jpeg Quarity 100

1 Select [Logging image] for [Target data].

2 Select the save target.

Select whether to save all logging images or a particular logging image.

3 Select the save destination folder.

To save the file to the RAMDisk or USB memory of the FH vision sensor, select [Sensor].

To save the file to the computer, select [Computer].

4 Save the file.

Click the [Save file] button to save the file.

The selected logging file is output to the specified folder.

8-4 Using the User Data Setting Tool

This tool allows you to edit user data.

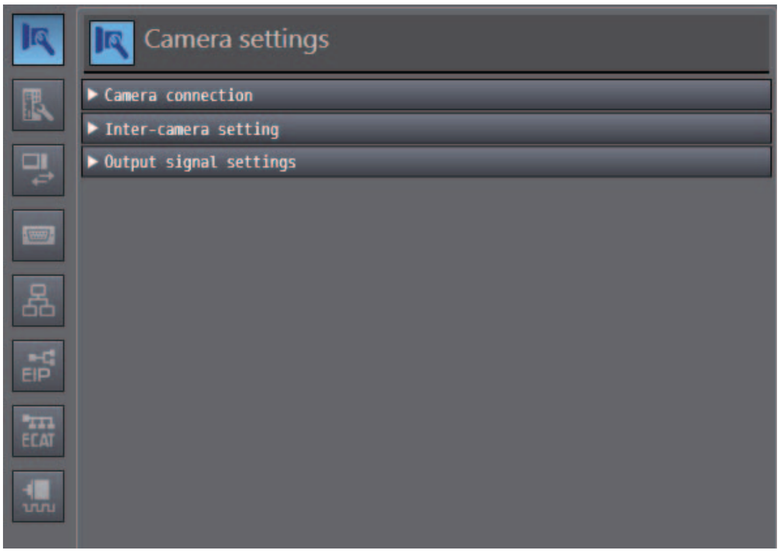
It is the same as the [Tool] - [User Data] function provided with the FH vision sensor.

For details, refer to the *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

8-5 Changing the System Environment

You can change the system data for the FH vision sensor in the system data editing screen.

Display the system data editing screen in the Edit Pane by double-clicking [System] in the Multiview Explorer or by right-clicking it and selecting [Edit] from the menu.



System data is classified into the groups shown in Table 1.

Clicking a group icon displays the editing items for the corresponding group.

System data includes parameters that require a restart to reflect the settings.

If a parameter that requires a restart is edited, "❗" is displayed for the sensor type in the Multiview Explorer. If "❗" is displayed, save the settings and then restart the FH vision sensor.

For details on restarting, refer to *2-4-4 Multiview Explorer* on page 2-10.

For details on each setting item, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

Table 1

Button	Item	Sub Item
	Camera settings	Camera connection Inter-camera setting Output signal settings
	Controller settings	Startup settings Fan control setting STEP setting Network drive settings Measurement setting Image logging settings Data log settings Operation log settings
	Parallel I/O settings	Settings
	RS-232C/422 settings	Settings PLC link settings
	Ethernet settings	Address settings Input/Output settings PLC link settings
EIP	EtherNet/IP settings	EtherNet/IP communication
ECAT	EtherCAT settings	EtherCAT communication
	Encoder settings	Encoder settings

8-6 Help

You can display the FH tool manual.

Display the sensor connection screen in the Edit Pane by double-clicking the type in the Multiview Explorer or by right-clicking it and selecting [Edit] from the menu.

Click [Sensor Information] - [Help] to display the manual for the FH series vision sensors.

8-7 Using the Security Setting Tool

With this tool, it is possible to edit the security settings.

This function is the same as the “Security Setting” function under the “Tool” menu in the FH vision sensor. For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

8-8 Using the Scene Group Saving Destination Setting Tool

With this tool, it is possible to edit the saving destination for the scene group.

This function is the same as the “Scene Group Saving Destination Setting” function under the “Tool” menu in the FH vision sensor. For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

Precautions for Correct Use

The Scene Group Saving Destination Setting tool cannot be used offline.

8-9 Using the Image File Save Tool

With this tool, it is possible to save the copy of both logged images and image files that are saved in the Image Sensor to a RAM disk or external memory device in FH Vision Sensor, or to a computer.

The save image file format can be selected from “Bitmap” or “Jpeg”.

8-9-1 Opening the Image File Save Tool

Double-click on [Tool] - [Image file save] in the Multiview Explorer, or by right-clicking it and selecting [Edit] from the menu.

The image file save tool window is displayed in the Edit Pane.

8-9-2 Saving the Image File

The image files in the following media can be copied, and then saved in the same media or computer as bitmap or JPEG.

- RAMDisk of FH vision sensor
- Connected external memory to FH vision sensor

If the file is saved in the JPEG format, it is possible to specify the quality (compression ratio) for each file.

1 Select [Image files] for [Target data].

2 Select the file.

The options below can be selected:

- save all files in a single specified folder, or
- save a single specified file.

3 Select the save destination folder.

Select [Sensor] to save the file(s) in the RAMDisk of FH Vision Sensor. Select [Computer] to save the file(s) in the computer. To delete the source file after saving a copy, check [Delete original data after save].

4 Initiate saving.

Click on the [Save file] button to save the image file(s). The selected file(s) are saved as the specified format.

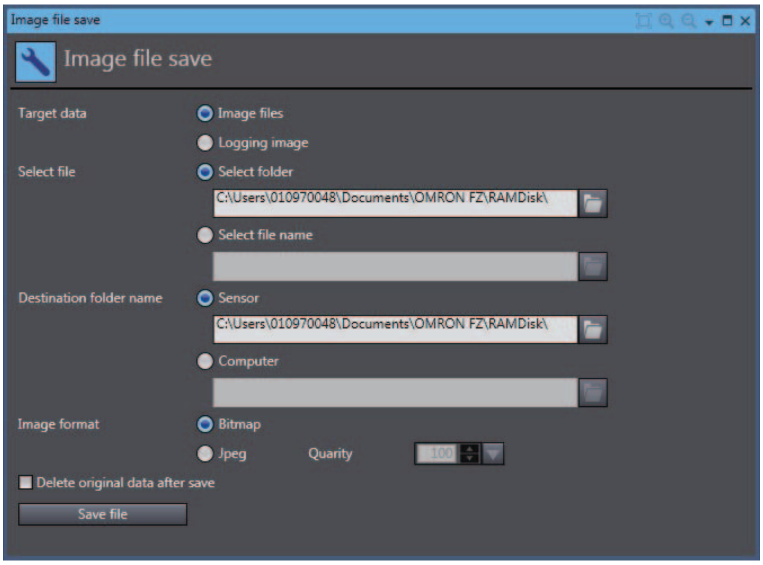


Image file save

Image file save

Target data ● Image files ○ Logging image

Select file ● Select folder C:\Users\010970048\Documents\OMRON FZ\RAMDisk\

○ Select file name

Destination folder name ● Sensor C:\Users\010970048\Documents\OMRON FZ\RAMDisk\

○ Computer

Image format ● Bitmap ○ Jpeg Quarity 100

☐ Delete original data after save

Setting item	Setting value	Description
Image format	• Bitmap • Jpeg	Select the image format to be saved.
Quality	0 to 100	Set the quality of the Jpeg image to be saved.

8-9-3 Saving the Logged Images to Files

The logged image files in FH Vision Sensor can be saved as bitmap or JPEG.

1 Select [Logging image] for [Target data].

2 Select the image file.

The options below can be selected:

- save all logged images, or
- save a single specified logged image.

3 Select the save destination folder.

Select [Sensor] to save the file(s) in the RAMDisk of FH Vision Sensor.

Select [Computer] to save the file(s) in the computer.

4 Initiate saving.

Click on the [Save file] button to save the image file(s).

The selected file(s) are saved as the specified format.

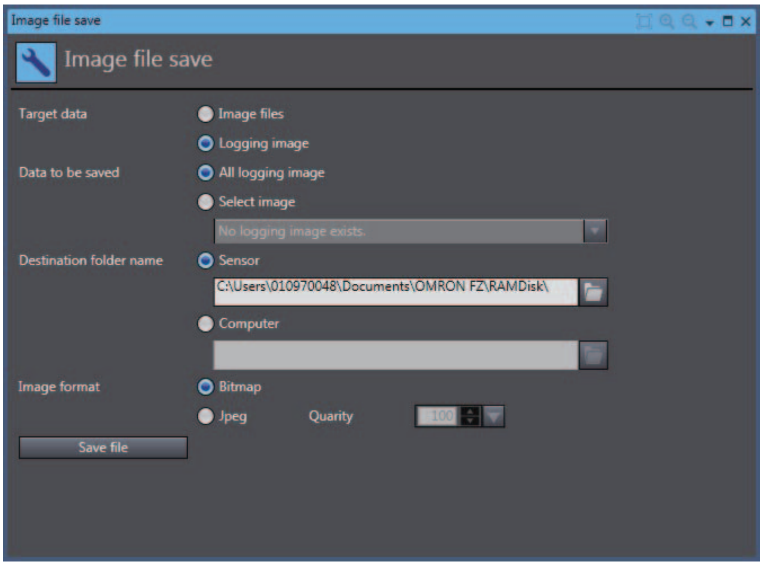


Image file save

Target data: ○ Image files / ● Logging image
Data to be saved: ● All logging image / ○ Select image
No logging image exists.
Destination folder name: ● Sensor
C:\Users\010970048\Documents\OMRON FZ\RAMDisk\
○ Computer
Image format: ● Bitmap / ○ Jpeg
Quarity 100

8-10 Using the Registered image Manager

With this tool, it is possible to save images used for model registration and reference registration as registration images. The saved images can be used for re-registration and adjustment of reference positions.

For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

8-11 Using the Update Standard Position Tool

With this tool, it is possible to set or change all reference positions at once for multiple processing units registered in the measurement flow.

This functions the same as the [Update standard position tool] function under the [Tool] menu in the FH vision sensor. For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

8-12 Using the Conversion Scene Group Data Tool

With this tool, it is possible to create a scene group that has more than or equal to 129 scenes.

This function is the same as the [Conversion scene group data tool] function under the [Tool] menu in the FH vision sensor. For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

8-13 Using the Scene Control Macro Tool

With this tool, it is possible to supplement and expand measurement flow and scene control.

This function is the same as the [Scene Control macro tool] function under the [Tool] menu in the FH vision sensor. For details, refer to *Vision System FH/FZ5 Series User's Manual* (Cat. No. Z340).

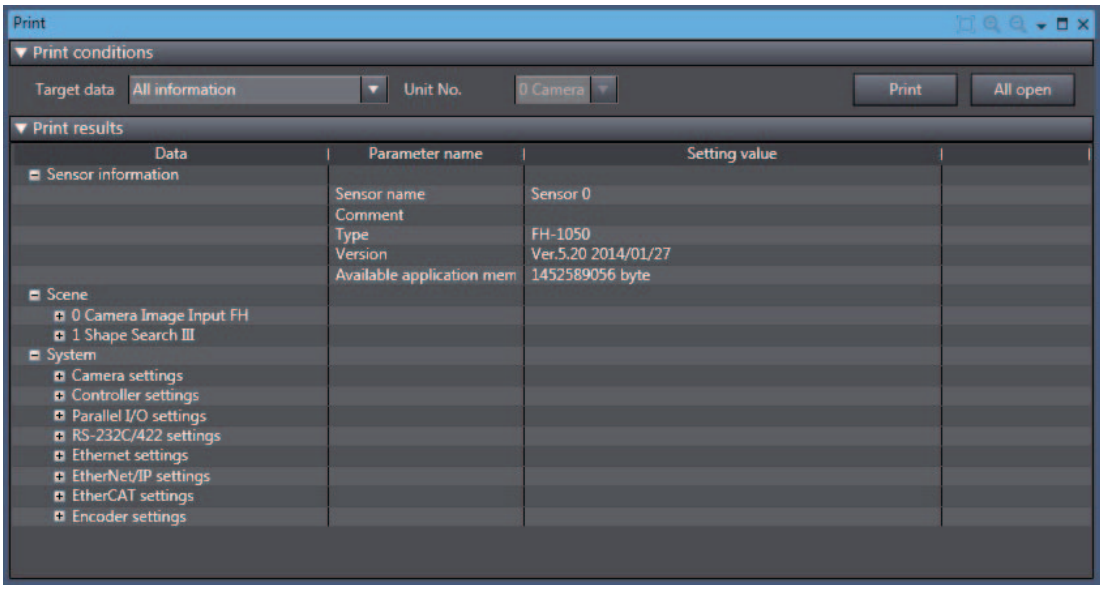
8-14 Print the Settings

With this function, it is possible to print the parameters set in the system data and currently selected scene data.

Target data	Description
All information	Prints all of the sensor information, and parameters set in the system data and the currently selected scene data.
Scene data	Prints parameters set in the currently selected scene data.
System data	Prints parameters set in the system data.
Processing unit	Prints parameters set in the processing units.

1 Open the print window.

Right-click on [Line*] in the Multiview Explorer and select [Print]. The [Print] window is displayed in the Edit pane.



Target data: All information
Unit No.: 0 Camera

Data	Parameter name	Setting value
⊟ Sensor information		
	Sensor name	Sensor 0
	Comment	
	Type	FH-1050
	Version	Ver.5.20 2014/01/27
	Available application mem	1452589056 byte
⊟ Scene		
⊞ 0 Camera Image Input FH		
⊞ 1 Shape Search III		
⊟ System		
⊞ Camera settings		
⊞ Controller settings		
⊞ Parallel I/O settings		
⊞ RS-232C/422 settings		
⊞ Ethernet settings		
⊞ EtherNet/IP settings		
⊞ EtherCAT settings		
⊞ Encoder settings		

2 Select the data to be printed.

Select the data to be printed from [Target data].

Select the parameter to be printed and expand the tree.

Click on [Expand all] to show all parameters.

3 Initiate printing.

Click on [Print] to print out the parameters shown.

Precautions for Correct Use

This command prints out only the parameters downloaded and uploaded with the Settings download and upload tools. For details on the "Settings download and upload tools", refer to *Vision System FH/FZ5 Series User's Manual* (Cat No. Z340).

9

Limitations

This section provides a list of the limitations associated with the use of the FH sensor controller with the FH tools.

9-1 Limitations 9-2
9-2 Synchronization with the NJ-series Controllers 9-5

9-1 Limitations

The FH tools have the following limitations.

Condition	Limitation
Registration of multiple FH series vision sensors to a project	Eight FH vision sensors can be registered to one project.
Editing of processing units	Limitations apply to editing processing units in Sysmac Studio. Refer to the following table.

List of the processing units supported in Sysmac Studio

○: Supported, x: Not supported

Processing Unit	Registration	Editing
Camera Image Input	○	x
Camera Image Input FH	○	○
Camera Image Input HDR	○	○
Camera Image Input HDR Lite	○	○
Camera Switching	○	○
Measurement Image Switching	○	○
Position Compensation	○	○
Filtering	○	○
Background Suppression	○	○
Brightness Correct Filter	○	○[*1]
Advanced Filter	○	○
Image Subtraction	○	○[*1]
Color Gray Filter	○	○
Extract Color Filter	○	○
Anti Color Shading	○	○
Stripes Removal Filter II	○	○
Polar Transformation	○	○
Trapezoidal Correction	○	○
Panorama	○	○[*1]
Machine Simulator	○	○
Search	○	○
Flexible Search	○	○
Sensitive Search	○	○[*1]
EC Circle Search	○	○
ECM Search	○	○
Ec Corner	○	○
Ec Cross	○	○
Shape Search II	○	○
Shape Search III	○	○
Classification	○	○[*1]
Edge Position	○	○
Edge Pitch	○	○[*1]
Scan Edge Position	○	○
Scan Edge Width	○	○[*1]
Circular Scan Edge Position	○	○
Circular Scan Edge Width	○	○[*1]

○: Supported, x: Not supported

Processing Unit	Registration	Editing
Intersection	○	○
Gravity and Area	○	○
Labeling	○	○
Label Data	○	○
Color Data	○	○*1
Defect	○	○*1
Precise Defect	○	○*1
Fine Matching	○	○*1
2DCode	○	○*1
Barcode	○	○*1
Character Inspection	○	○*1
Model Dictionary	○	○*1
Date Verification	○	○*1
Circle Angle	○	○
Glue Bead Inspection	○	○*1
OCR	○*2	○*2
OCR User Dictionary	○*2	○*2
Calculation	○	○
Unit Calculation Macro	○	○*1
Circle Regression	○	○
Line Regression	○	○
Movement Single Position	○	○
Movement Multi Points	○	○
Convert Position Data	○	○
Position Data Calculation	○	○
Precise Calibration	○	○
Vision Master Calibration	○	○
PLC Master Calibration	○	○
Reference Calib Data	○	○
Camera Calibration	○	○
Get Unit Data	○	○
Get Unit Figure	○	○
Set Unit Data	○	○
Set Unit Figure	○	○
Detection Point	○	○
Image Logging	○	○
Image Conversion Logging	○	○
Data Logging	○	○
Trend Monitor	○	○
Statistics	○	○
User Data	○	○
Data Save	○	○
Robot Data	○	○
Stage Data	○	○
Iris	○	○*1
Focus	○	○*1
Unit Macro	○	○*1
Wait	○	○
Elapsed Time	○	○

○: Supported, x: Not supported

Processing Unit	Registration	Editing
Parallelize	○	○
Parallelize Task	○	○
Conditional Branch	○	○
DI Branch	○	○
End	○	○
Selective Branch	○	○
Control Flow Normal	○	○
Control Flow PLC Link	○	○
Control Flow Parallel	○	○
Control Flow Fieldbus	○	○
Parallel Judgment Output	○	○
Data Output	○	○
Parallel Data Output	○	○
Fieldbus Data Output	○	○
Result Display	○	○
Display Image File	○	○
Display Last NG Image	○	○

*1. To edit the processing item, Sysmac Studio with version 1.09 or later is required.

*2. To register and edit the processing item, FH vision sensor with version 5.20 or later is required.

Precautions for Correct Use

The below application will run while the FH vision sensor is being edited offline.

FZ-CoreRA 0.exe

Do not attempt to exit this application manually. Exiting this application prematurely may cause problems to arise with the FH editing. Should the application be closed accidentally, end SysmacStudio, restart the computer, and try again.

9-2 Synchronization with the NJ-series Controllers

Consider the following limitations when synchronizing the project with the NJ-series controller to which the FH vision sensor is connected.

● Downloading ([Transfer to Controller])

- The setting data in FH vision sensor are not downloaded.
- To download the setting data in FH vision sensor, establish an online connection for the vision sensor. Refer to *2-8 Precautions on Synchronization through an NJ-series Controller* on page 2-39.
- The global variables allocated to the FH vision sensor I/O ports in the I/O Map are downloaded.

● Uploading ([Transfer to computer])

- The setting data in FH vision sensor are not uploaded.
- The FH vision sensor setting data are initialized after uploading. Be sure to establish an online connection for FH vision sensor before the synchronization. Refer to *2-8 Precautions on Synchronization through an NJ-series Controller* on page 2-39.
- The global variables allocated to the FH vision sensor I/O ports in the I/O Map are downloaded.

For details on the synchronization to the NJ-series controller, refer to *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

10

Troubleshooting

10-1 Troubleshooting for the EtherCAT 10-2
10-2 Sysmac Error Status 10-3

10-1 Troubleshooting for the EtherCAT

For details on how to perform troubleshooting for the EtherCAT, refer to *Vision System FH/FZ5 Series User's Manual for Communications Settings* (Cat. No. Z342).

10-2 Sysmac Error Status

For details on Sysmac error statuses, refer to *Vision System FH/FZ5 Series User's Manual for Communications Settings* (Cat. No. Z342).

A

Appendices

A-1 Sysmac Device Features A-2

A-1-1 Sysmac Error Status A-2

A-1-2 Saving the Node Address Setting A-3

A-1-3 Serial Number Display A-4

A-1-4 Compliance with ESI Specification (ETG.2000 S (R) V1.0.1) A-4

A-1-5 SII Data Check A-4

A-1 Sysmac Device Features

The control device product designed according to standardized communications and user interface specifications for OMRON control devices are called a Sysmac Device.

And the features available with such a Device is called Sysmac Device Features.

A-1-1 Sysmac Error Status

Because, in Sysmac Devices, errors that may occur in slaves are systematized, you can check the causes and remedies for errors with a common procedure.

The status of an error can be monitored in the Sysmac Error Status (2002-01 hex). To display the error status detected by the FH series Vision Sensor in Sysmac Studio, the Sysmac Error Status (2002-01 hex) must be mapped to the PDO. Sysmac Studio, by default, uses the 512th transmit PDO Mapping assignment to map the Sysmac Error Status (2002-01 hex) automatically to the PDO.

Additional Information

- For the Sysmac Error status (2002-01 hex), refer to *Vision System FH/FZ5 Series User's Manual for Communications Settings* (Cat. No. Z342).
- For errors displayed in Sysmac Studio, refer to *NJ-series Troubleshooting Manual* (Cat. No. W503).

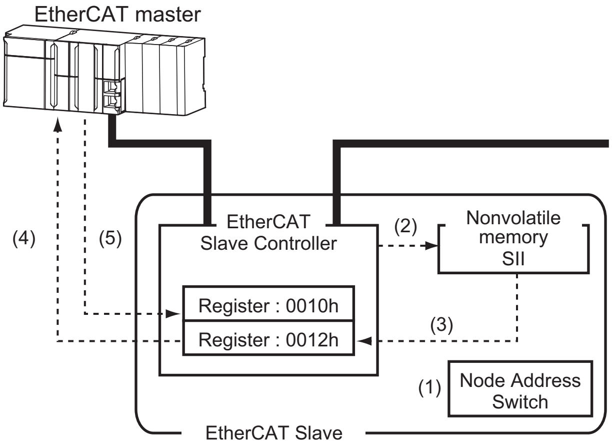
A-1-2 Saving the Node Address Setting

When the node address switch setting is “00” (Software Setup mode), the node address value you set in Sysmac Studio is enabled. If the node address switches are set to any other value, the value that is set on the switches is used as the node address.

In the Software Setup mode, in Sysmac Studio, execute [Write Slave Node Address] on the [EtherCAT Edit] screen to save the slave node address setting in the nonvolatile memory of the FH series Vision Sensor.

Software Setting

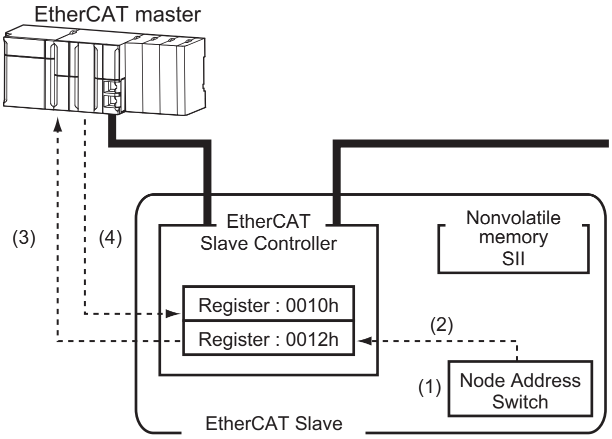
The set value saved as Slave Information Interface (SII) information in the nonvolatile memory of the slave is the node address.


EtherCAT master
(4)
(5)
EtherCAT
Slave Controller
(2)
Nonvolatile
memory
SII
Register : 0010h
Register : 0012h
(3)
(1)
Node Address
Switch
EtherCAT Slave

(1) The Node Address Switch is set to "00" at power OFF.
(2) Write a node address set value to Slave SII from the master.
(3) The value of the node address setting is applied to Register: 0012 hex by the software, when the slave power is ON.
(4) EtherCAT master reads the set value of Register: 0012 hex.
(5) EtherCAT master writes the value of 0012 hex address to 0010 hex address as the node address value.

Node Address Switch Setting

The value set on the node address switches is the node address.


EtherCAT master
(3)
(4)
EtherCAT
Slave Controller
Nonvolatile
memory
SII
Register : 0010h
Register : 0012h
(2)
(1)
Node Address
Switch
EtherCAT Slave

(1) The Node Address Switch is set at power OFF.
(2) The value of Node Address Switch is applied to Register: 0012 hex, when the slave power is ON.
(3) EtherCAT master reads the set value of Register: 0012 hex.
(4) EtherCAT master writes the value of 0012 hex address to 0010 hex address as the node address value.

A-1-3 Serial Number Display

The serial number saved in the nonvolatile memory of the Vision Sensor is displayed in the Serial Number (1018-04 hex). Controllers that support Sysmac Device Features can use this serial number to check the network configuration. To enable this check, in Sysmac Studio, set [Serial No. Check Condition] to [Set Value = Actual Unit] on the [EtherCAT Edit] screen. If the set condition is not met, a Network Configuration Check Error will occur.

Additional Information

This network configuration check detects any slave devices that have been replaced, which prevents you from forgetting to set parameters on those slaves.

A-1-4 Compliance with ESI Specification (ETG.2000 S (R) V1.0.1)

The ESI Specification is a set of specifications that define the entries required in an EtherCAT Slave Information (ESI) file.

A-1-5 SII Data Check

The Slave Information Interface (SII) is an interface area in the nonvolatile memory of an EtherCAT slave that stores the configuration information specific to that EtherCAT slave.

Sysmac Device EtherCAT slaves check the SII information from the slave side.

If one of these slaves finds that SII information with which it cannot operate was written, it generates an SII Check Error (Error No. 88.3). If this error persists even after turning OFF and then ON the power again, contact your OMRON sales representative.

Precautions for Correct Use

Do not use third-party or any other configuration tools to edit the SII information.

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